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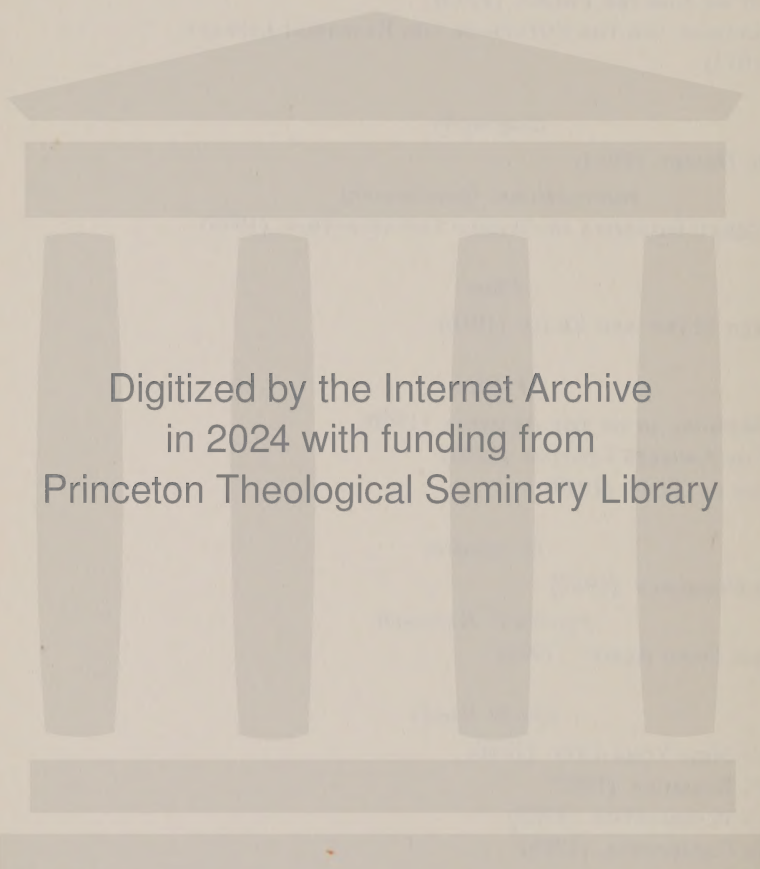
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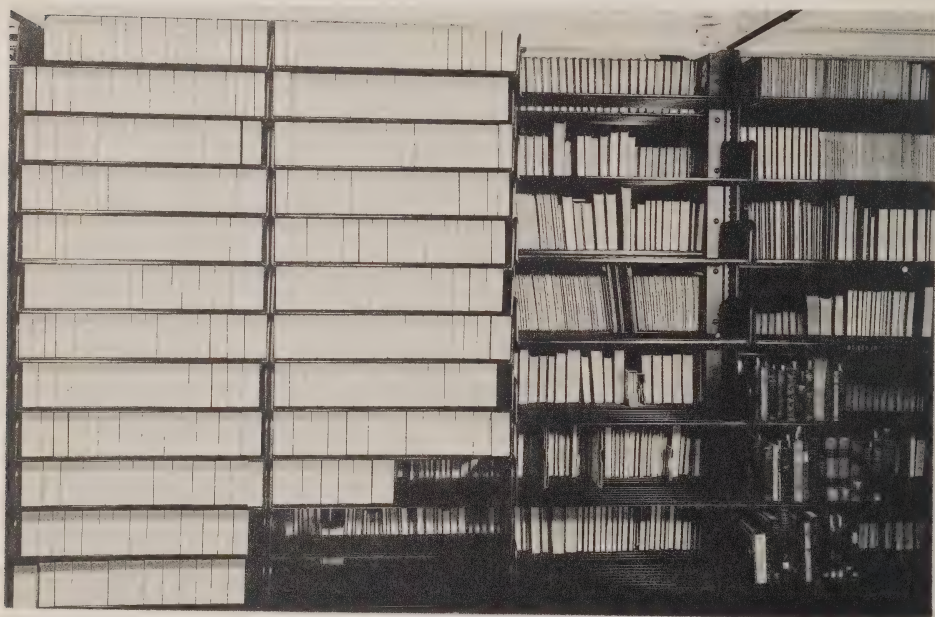


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Compact Book
Storage



BEFORE



AFTER

These two pictures show clearly what "compact storage" accomplishes. Shelved conventionally, the 396 volumes of this long government set, some cloth bound, some board bound, some unbound, took up $3\frac{3}{8}$ tiers of shelf space. In "compact storage" the same set occupies $1\frac{1}{4}$ tiers.



Compact Book Storage

*Some Suggestions toward a New Methodology
for the Shelving of Less Used Research
Materials*

By FREMONT RIDER

LIBRARIAN, THE WESLEYAN UNIVERSITY LIBRARY

NEW YORK CITY
THE HADHAM PRESS
1949

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To
PROFESSOR FREDERICK DENT LOSEY
MASTER USER AND MASTER TEACHER
OF ENGLISH
TO WHOM THE WRITER OWES MUCH
FOR WHATEVER FACILITY IN WRITING
HE MAY HAVE.

PREFACE

THIS slender book is obviously in no sense a comprehensive manual of library book storage practice. It is, instead, a description of what is, in some of its details at least, a new method of book storage. Because this description is based on nearly five years of successful experimental trial of this new form of storage here at the Wesleyan Library the writer hopes it may have some constructive value.

Fremont Rider

Wesleyan University

May, 1949

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Analysis

CHAPTER 1

THE FUNDAMENTALS OF BOOK STORAGE

FIVE years ago the writer wrote a book* which was hailed by a good many indiscriminating readers as forecasting the doom of libraries of books. It is necessary to insert "undiscriminating" in this last sentence for in this same book there appeared this categorical statement: "Microcards going to supplant books? Don't for a moment get *that* idea. Of course they won't; every research library will continue to have real books, hundreds of thousands of them, millions of them." But, if neither microcards, nor any other substitute for the conventional printed "book," is going to supplant it, the librarian will always have to face—for books—those interlacing problems of purchase, cataloging, binding and storage, attempts at the solution of which make up most of the technology of librarianship. And he will be particularly interested in those attempts at solution—however tentative they may be—which reach out in new directions.

This little book concerns itself with only the last of these four main categories of library operation. But there is this good reason for giving special attention to it: it is by far the costliest of them. Unfortunately

* *The Scholar and the Future of the Research Library*. New York City, Hadham Press, 1944, p. 162.

this is a fact of which many librarians, and still more administrators and trustees, are unaware; and the reason why they are unaware of it is that, in the absurdly misleading forms of accounting which most libraries are now forced to follow, book storage costs are almost entirely concealed costs. The larger portion of them are building costs, and building costs are not presented afresh each year in recurring library budgets, but were long ago buried in capital investments of which, unfortunately, budgetary accounting takes no notice.

But other book storage costs, beside interest on building investment and building insurance and depreciation, also fail to appear on library budgets. The cost of operating a library building can usually be arrived at only after a lengthy and difficult analysis of other of the institution's accounts. Yet to gain a true picture of the cost of book storage, expenditures made for stack lighting and heat, for janitorial and elevator service, etc., must be known, since all these are obviously parts of what it costs a library to store its books on its shelves.

In recent years, however, the librarians of all college and research libraries, and the administrators and trustees who stand above them in authority, have been forced to look behind their inadequate accounting and find out about book storage costs. Two new developments have exerted this pressure upon them. One has been recently published analyses* which revealed for the first time the astounding rates of

* "The Scholar and the Future of the Research Library," Chap. 1.

growth which libraries of the research type are obliged to cope with, rates of growth which, it was shown, are of a geometrical rather than an arithmetical order. The other has been the post-war inflation in the costs of building, which have mounted up at rates which have been equally disconcerting. These two coincident pressures have rather abruptly brought about a general realization that the cost of housing a library presents today intensely practical and important problems. It may be granted that, some day, a quite different form of the printed word may supplant a large proportion of our books. It may be granted that our research libraries may not continue to proliferate at their past doubling-every-sixteen years rate. Caution, however, forces us to note that both of these statements are qualified by "mays." At present we still do have books and we still do have research libraries which are growing with alarming **rapidity**.

The first thing that strikes any one attempting any serious study of the techniques of book storage, and the costs of them, is the general, and rather astonishing, inadequacy of existing literature upon this whole phase of library work. It is an inadequacy which appears nowhere else in our technology. The purchase cost of books, and suggested ways to reduce it, are subjects on the agenda of almost every meeting of librarians. The cost of cataloging, and suggested ways to reduce it, have been the subject matter of a long series of voluminous official reports and of innumerable personally developed books and papers.

Furthermore, when one examines the literature of book storage one is struck by its antiquity as well as by its paucity. Not only has amazingly little been written about the storage of books but most of what has been written appeared sixty or seventy years ago. It was the founding fathers of the library profession, and the scholars contemporary with them, who were worried about library growth and the cost of housing it. We find, for instance, no less a person than Gladstone, writing back in 1890:* "Already the increase in books is passing into geometrical progression . . . A vast, and even bewildering prospect is before us" . . . And, Richard Garnett, five years later, remarked, in phraseology which also sounds astonishingly contemporary: "The general question of providing space in libraries for indefinite future accessions does not seem to me to have as yet received attention in any degree proportionate to its importance."

One naturally cannot help speculating why there has been this half century of silence on a phase of library work which actually ranks first in cost importance. The best guess one can make by way of answer is that it was a result of the development, along in the nineties, of a new form of book storage, the so called all-metal "book stack." This was so great an improvement over all forms of book storage that had preceded it that the library profession ac-

* Gladstone, W. E. "On books and the housing of them." *Nineteenth Century*. March, 1890.

Garnett, Richard. "On the provision of additional space in libraries." *The Library*, 1895. v. 7, p. 12.

cepted it forthwith as not only a better book storage, but as a definitively perfect one. This assumption of bibliological definitiveness itself offers interesting ground for philosophical study. Writing about another field of library technology Currier some years ago remarked: "It has been said that a book should be cataloged in so permanent a fashion that the work will never have to be repeated. I do not believe it." In a paper which the present writer gave at the University of Chicago he quoted this statement of Currier's and then went on: "The vice of the contention that Currier attacks lies in its tacit assumption that . . . there is such a thing as perfection or finality of cataloging method . . . This same assumption is inherent in a great deal of our . . . library philosophy . . . These assumptions are . . . a reflection of the general philosophical synthesis that underlay the Victorian epoch . . . When the library movement began, it began in an orderly universe, unworried by Einsteins and Eddingtons—an orderly universe which librarians were gradually and delightedly reflecting in their bibliographical cosmos. To the pioneers of the eighties and nineties the framework of the Decimal Classification was obviously definitive: all that remained to be done was to work out a more and more minute sub-division of its sub-sub-classes. In the same way the basic framework of cataloging method had at last been built for good and all: all that remained was a finer and finer definition of its details. And library buildings, and their stacks, had clearly at last assumed their final form: all that *they* required was

a refinement and elaboration of their construction and function.”*

This teleological theory may or may not be valid. Whatever the reasons may have been which lay behind the unanimous acceptance by the library profession of our present form of “book stack” as the ultimate word in book storage, the significant fact is that it was so accepted. For over half a century, except for two or three references to the “cubook” method of computing stack storage capacity, and Mr. Stetson’s continuing propaganda for sloping lower shelves, one can count on the fingers of one hand all of the articles on book storage which appeared in the entire literature of librarianship. Furthermore, with the notable exception of Mr. Van Hoesen’s two statistical analyses of book sizes (of which more will be said later), those very few articles on book storage which did appear contained nothing new: all of them were rehashings of older material.

Now it *may* be true that book stacks do offer the most efficient method of book storage. It *may* be further true that, out of all the possible forms that book stacks might take, that form of them in present use is the most efficient one. And it may, finally, be true that we are using book stacks, in their present form, in the most efficient way possible. But, before we accept any one of these three conclusions as genuinely axiomatic rather than as merely traditionally accepted assumptions, it is obviously desirable that we examine, at each one of these three levels of

* “Alternatives for the present dictionary card catalog.” 1940. p. 134.

analysis, some of the alternatives possible. After all, seventy-five years is a long time, in a world in so rapid a state of flux as ours now is, for even fundamentals to remain in every respect unchanged.

If we are going to attempt really to analyze book storage it is going to be necessary for us first to break down the process as a whole into its integral elements. If we do this we will arrive at some such a chain of dicta as the following:

1. A "book" (in the occidental world at least) is a collection of flat sheets of printed paper fastened together in some way.

2. Books are usually oblong in shape, and are almost always fastened along one of their long edges.

3. Books are usually stored in an upright position, upon the "bottom" one of their short edges, in rows placed upon a vertically superimposed succession of flat wood or metal "shelves."

4. To make it convenient to put them into and take them out of this kind of storage the "back strips" of their "bindings" are marked with their author's names, or their titles, or with certain other indicia, so that we can identify each book without taking it off its shelf and looking inside it.

5. Where large collections of books are housed several ranges of shelves are set up back to back in parallel immovable rows; and, to give access to the books on these rows of shelves, "aisles" are provided between each facing pair of rows.

6. For very large collections these parallel rows of shelves and aisles are multiplied in successive, ver-

tically superimposed, "decks" (floors)— these multiple decks constituting what we term a "book stack."

These six "dicta" all seem so obvious that the reader is likely to be thinking at about this point: since this is so clearly the way that books *have* to be stored why so much talk about it? But it is exactly this "assumption of inevitability" that we are trying *not* to make. In this book we are going to search for greater efficiency—for radically greater efficiency—in book storage. If we are to get anywhere in this sort of a search, we dare not take *anything*—not even the most "obvious" of the dicta summarized above—for granted.

Suppose, just as a start at analysis, we take Dictum Five and ask ourselves this question: how efficient is our present use of building space? Even the most superficial sort of analysis discovers that the aisles that give us access to our shelves of books take up far more cubic feet of stack space than do the shelves themselves with their books on them (the ratio between aisles and shelving being somewhere around 65% and 35%). This ratio may tempt us to look into the storage efficiency of the shelf portion only of our stack space. Whereupon we discover that there are, on the great majority of our library shelves, far more cubic inches of empty air than there are cubic inches of stored "book," (here again in the average ratio of 65% and 35%). Putting these two "discoveries" together we find that at least 90% of our supposedly very efficient stacks is at present occupied by empty air and less than 10% by "book." But

this means that, if we could find some way to cut down the vacant cubic space in our present stacks by as little as 10% (i.e. if we could cut the non-book space in it down from 90% to 80%) we would actually *double* the book storage capacity of our stacks.

When we analyze and rephrase our book storage problem in such concrete terms as these it begins to take on a different aspect, doesn't it? Once we come to realize that our present book stacks are not really efficient at all, but are, instead, absurdly wasteful of their space our six Dicta cease to seem quite so invulnerably axiomatic. We begin to see that perhaps they are, after all, only what "The Scholar . . ." called "bibliological pseudoaxioms," i.e. book customs, hoary with centuries of use, but carrying with them no inherent inevitability.

But for all that the burden of proof in proposing any change in them still rests entirely upon us. And, just so that we may keep our feet on the ground, it may be well for us to remember at this point that the maximum of book storage capacity would be reached if books were piled up in bins in completely solid masses like wheat or coal. Clearly, however, such 100% "efficiency" in book storage has no practical applicability, because books stored in libraries have to be more than merely "stored": in isolated separate units they have to be continually taken out of storage and put back in. And library storage demands just as much efficiency in the getting-in and putting-back processes as it demands efficiency in storage *per se*.

CHAPTER 2

THE STORAGE SEGREGATION OF MUCH USED AND LITTLE USED BOOKS

IT is important to emphasize before we go further that this book, as its sub-title states, concerns itself primarily with the storage of less-used materials. Which means, in practice, that it is addressed to the research librarian rather than to the librarian dealing with the general public.

A research library need not necessarily be a large library although it usually is. The more significant attribute of research materials is that they have not been assembled either for sustained, or for pleasurable, reading. Instead they are held in storage for the purposes of scholarly investigation. "Research libraries are primarily, the stored-up knowledge of the race, warehouses of fact and surmise, in all their forms and infinitely remote ramifications, the raw material from which our humanists and our scientists are going later to develop new facts and fresh surmises. Research materials are in a sense the building blocks of civilization; and the *storage* element in the function of the research library—just the sheer holding of book and periodical materials, not for any immediate use at all, but for some possible, and possibly

remote, future use—is an extremely important, but not always very well understood, part of that function.”*

Generally speaking, research materials possess in common three characteristics. The first was remarked above, that, somewhat paradoxically speaking, they are *not read*. Usually the research worker wants only to make a “reference” use of his materials; he desires to verify a date, to find a chemical formula, to check up on the terms of an equation, to note the exact phraseology of a legal decision, to review a psychological reaction, to look at a map, to examine an anatomical drawing.

Their second characteristic is a correlative of the first, and it becomes very important when we come to consider their storage: it is that they are, comparatively speaking, little used. The law of averages would alone make this true. If, in a given university library, one hundred thousand volumes are serving quite adequately its nine thousand undergraduates, while it takes nine hundred thousand to meet the needs of its one thousand faculty and graduate students, it follows, mathematically, that each one of its undergraduate volumes will, on the average, get one hundred times as much use as each one of its research volumes.

The third outstanding characteristic of research materials is that they are used, and can be used, only by “scholars,” that is by persons who have reached a certain level of intellectual competency.

* “The Scholar and the future of the research library.” p. 21.

Just because research materials have these three characteristics we librarians are beginning to realize that we have all these years been making a mistake when we accorded to them and to "popular" (undergraduate) materials an identical bibliological treatment. Because the users of research materials are on a different intellectual level from the users of popular books they require a different sort of library service, a service in some respects more expensive, but in most respects less so. The cataloging best for callow undergraduates is not at all the best one for advanced scholars. The expensively sturdy binding necessary for books set aside for reserve reading is not at all necessary for seldom-used items. And, finally—and this is what interests us in this little book—the shelving techniques which may be desirable for browsing rooms are not, necessarily, or even probably, the most efficient techniques for the storage of books very seldom called for. If it be retorted that all this implies a definite segregation of graduate and undergraduate materials, the answer is that it does. In fact this book is based on the assumption of such a segregation.

Of course, against such a segregation well-intentioned argument can be, has been, and will continue to be, made. It will be said that the undergraduate ought to be "exposed" to research materials; and with this most of us, probably, will agree. But we may also question whether a proper "exposure" means anything more than an eager willingness to throw open the research collections of the library freely to

any undergraduate showing the slightest evidence of the desire and the ability to use them intelligently. Merely to have research materials thrust in the undergraduate's way does not constitute, it seems to some of us, a helpful "exposure" to them. Most undergraduates are not equipped, by either instruction or experience, to use research materials intelligently: as a result they misuse them. They abuse them physically. And, when they attempt to use what is inside their covers, they are, all too often, misled by wholly superficial indicia. They pass over the genuinely significant and select the biased and the obsolete. They are repelled by solid but unimpressive documentation, and even by such irrelevant trivia as dirt and crumbling bindings.

The writer, who has long been an apostle of segregation, phrased the positive argument for it a half dozen years ago in the following words: "By it the undergraduate is brought into easy access with *fresh* materials only, which have been selected to appeal to him and to his particular curricular needs*: he is

* Rider: "The Wesleyan University Library: an analysis of its past history, present position and possible future policy." The Wesleyan University Library. 1943.

Gosnell puts the same thought: "For the undergraduate, a live and concentrated collection would be far more satisfactory. He would be spared much floundering among dead and misleading titles."—"Obsolete library books." By Charles F. Gosnell. *Scientific Monthly*. May, 1947.

Compare also a similar comment by Burchard, Davis & Boyd, in their recently issued "Planning the University Library Building" (p. 31): "Others hold that the user of the library, especially the beginning student, is overpowered by the immensity of a large stack and the supposed pedagogical advantages are thus lost through discouragement. It is also plausibly argued that . . . no grouping of books can bring together all the works on a given subject."

not confused by a mass of materials whose content lies quite beyond his scholastic experience. On the other hand, the worker in research materials is equally pleased: he has *his* books by themselves: he is not distracted by "reserve" books and the like, and by library methods especially adapted to students not yet familiar with the scholarly use of materials."

It has been argued that a segregation of scholarly and undergraduate materials will increase library operating costs. There is good reason to believe that the exact opposite is true. Research materials permit a more economical storage, a more economical cataloging, and a more economical binding than we have been giving them; and, since they constitute an overwhelming majority of every university library's total holdings, these economies are very significant. And without segregation no one of these three economies can be fully realized.

During these past few months many of us have been privileged to inspect the splendid new Lamont Library at Harvard, the first library building designed solely for undergraduate use and housing only undergraduate materials. It is so novel in its concept and so well planned in its detail that every librarian is professionally bound to see it and study it.

A recent correspondent argued against undergraduate library segregation because he said he felt there was no "sharp clear cut difference" between graduate and undergraduate use. He added that he understood that the use of the Widener Library at

Harvard by undergraduates had actually increased since the Lamont Library had opened, implying that this fact showed that undergraduate segregation there had been a mistake. I am sure that the Harvard staff would be the last to assert that any such sort of "sharp clear cut difference" existed; and that they would look upon an undergraduate increase of Widener use—it it has occurred—as a distinct endorsement of undergraduate segregation, not the reverse. It is the purpose of Lamont pleasantly to make Harvard undergraduate book users. But *that* is only the first step. I believe that they are right in their idea that it is the first step that is the hard one to stimulate.

Not only does there exist no "sharp clear cut difference" between graduate and undergraduate materials; but the place at which, in practice, the demarcation line is going to be drawn will be different in every library which attempts such a segregation; and in the same library it would vary according to the actual conditions which existed at the time the segregation was made and will change in each library with changes in those conditions. It is the same as with other attempted demarcations between less used and much used materials: every library will draw its line at a different point. When, for example, the Midwest Storage Warehouse is ready for use, some of its cooperating libraries (which happen to be still possessed of relatively plenty of room) will skim only lightly from their own shelves to make their deposits in it: others (which are badly cramped for space) will

make their demarcation line between "little used" and "active" materials very much lower down. No, there is no "clean cut line" between such categories as "active" and "inactive," "less used" and "much used," "graduate" and "under graduate." And the "line" set today will not be the line set tomorrow.

Harvard has also been a pioneer at segregation in another direction. For a half dozen years or more it has been drawing off from its main library hundreds of thousands of its least used research materials and storing them in a "warehouse" library a mile or more away from its main building. The New York Public Library has been doing the same thing. And numerous similar plans, notably the one mentioned for the middle west, are now in process of either formulation or execution.

For these "warehouse" libraries this little book will also be of interest, for the method of increasing present stack storage capacity which it proposes is just as applicable to warehouse libraries as it is to the libraries whose stack congestion the warehouse libraries have been set up to relieve. Nor is compact storage something only for great research libraries and for threatening-to-be-even-greater "warehouse" libraries: there are hundreds of small libraries which now face, or will shortly have to face, a book storage problem. For each of these libraries the problem of storage will be as acute, in proportion to its size, as it was for Harvard. So for these small libraries also this book was written, because for them also a segregated and more compact storage of their "less used

materials'' is an entirely practical possibility.

Now, just to stretch our minds a little—an always admirable exercise—the next chapter is going to run over, very briefly indeed, three or four forms of book storage construction which bear very little, if any, resemblance to our conventional forms. After this preliminary clearing of the ground we will go on to more promising alternatives: first, to a chapter discussing certain methods of storage in stacks but in stacks of a different sort than our present ones, and, finally, to the several chapters which are the excuse for this book, chapters which will suggest the possibility of a more compact book storage in our present stacks, exactly as they now stand without any structural change in them.

CHAPTER 3

THE RUBE GOLDBERG CHAPTER

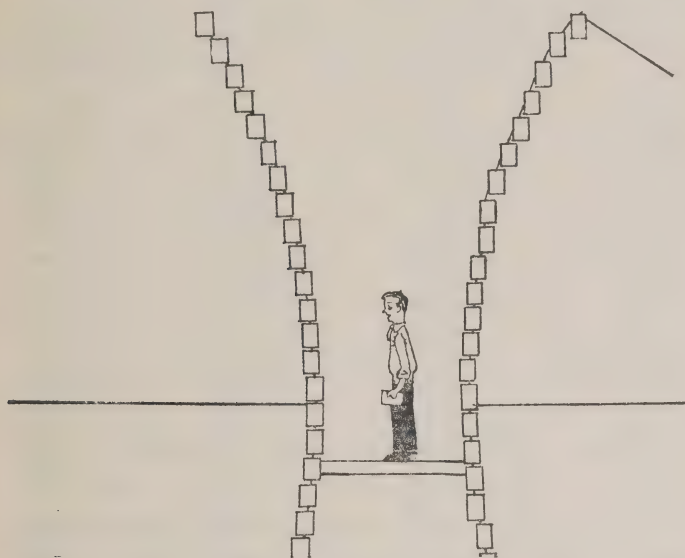
AS HAS just been suggested, this chapter has no practical value whatever. Any reader desiring to do so may therefore skip it!

It would be quite impossible to say how many entirely unconventional forms of book storage construction could be imagined. If the three or four here mentioned are given short shrift it is only because none of them seems to hold out any promise of usefulness. Note, however, the insertion in this sentence of the cautionary word "seems." In invention, as in pure research, one can never tell what idea, in itself so fantastic as to appear utterly beyond the range of possibility, may, by some little quirk of change, lead to another idea that is at least remotely possible, and this in turn, by still another little quirk of change, to a third idea offering compelling practicality.

Just as an example of this way in which the utterly fantastic may lead to the possibly practical (and also an example of the way an inventor's mind works!) let us consider for a moment what might be termed "Ferris wheel" book storage. However absurd such a form of storage may sound it has to be admitted at once that it is mechanically *possible*. There

is nothing whatever to prevent our hanging a ring of automatically-self-righting book-shelf boxes on the periphery of a gigantic wheel (like the self-righting cars on a Ferris wheel).

Suppose we immediately take a first step towards practicality, and envisage, instead of one wheel, an indefinite succession of narrow Ferris wheels, each



FERRIS WHEEL BOOK STORAGE

one a book shelf wide, and all of them set side by side facing a single aisle. Or, taking a second step toward practicality, suppose we should set up two rows of such wheels facing a common aisle. It is obvious that it would be entirely possible for the seeker for a given book shelved in any one of the boxes on these two rows of wheels to stand in that one aisle, to

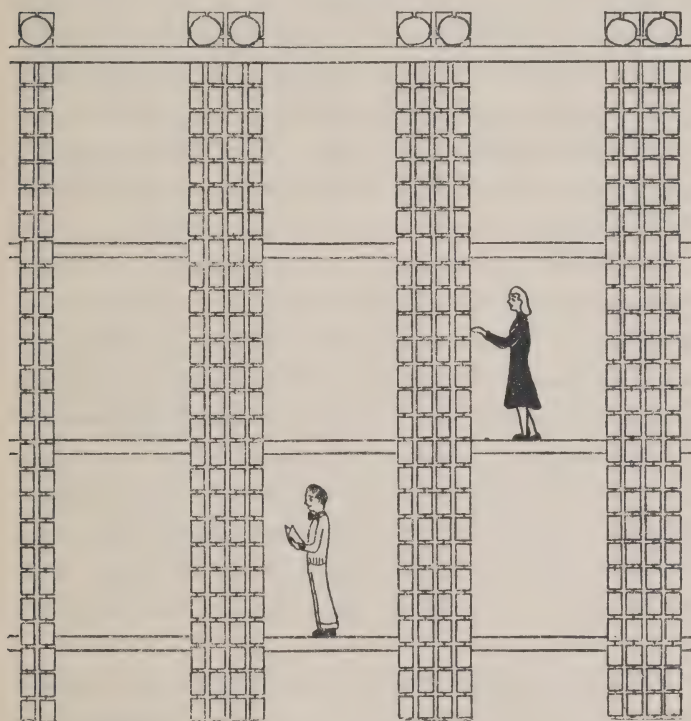
revolve the desired wheel (shall we say by means of an individual motor operated by push-button control?), turning it until the particular shelf wanted was brought around to the place in the aisle where he stood waiting for it to come to him.

But what in the world would be gained by any such an absurdly ponderous and expensive book storage fabrication as this? It wasn't promised, we must remind you, that anything in this chapter was going to "gain" any one anything except a stretching of one's imagination! Yet, for all that, this Ferris wheel installation, like every other one of the fantastic installations mentioned in this chapter, does gain something. What the "Ferris wheel stack" gains—even though it gains it at an impossibly extravagant cost—is a something that in itself is well worth gaining, i.e. a greater convenience of access to the books stored. What really happens in this case is this: that, instead of one's having to go to the stack to get a book, any desired portion of the stack is brought to one where one is standing waiting for it to come. It is clear that in a "Ferris wheel storage" installation (diagrammatically shown in cross section on this page) the books in all of the car-boxes hung on all of the "wheels" on both sides of the one aisle can be brought, one shelf at a time, to a person standing in the aisle. Furthermore—and this is also a "gain"—the wheels can be stopped at a point that places the book desired at convenient eye-height and hand-height.

But we have no sooner diagrammed our Ferris wheel than its supersedence is suggested in favor of

a quite different sort of book storage installation, one that offers every advantage that "Ferris wheel storage" offers, and does so at much less cost. To give a name to this fourth quirk of change it might be called "elevator belt storage."

If we should take all our "Ferris wheels," and should flatten them out along their vertical axes, and then should insert stack decks at proper intervals, we would arrive at something which, in vertical cross section, would look something like this:



ELEVATOR BELT BOOK STORAGE

By means of this vertical compression we have accomplished a very great gain in efficiency: in the cubic space originally occupied by two rows of "Ferris wheels" facing a single aisle we are able to install a whole series of vertical "elevator belts" of self-righting book shelves facing a succession of aisles, each one of these "belts" holding almost as many books as one of the "wheels" did.

At first glance our "elevator belt" installation looks very much like a cross section of conventional stackage. But a second glance shows us that we have simply come a fifth step nearer practicality. With the "Ferris" wheels we *had* to leave out all our deck floors but one, with "belt" storage we have been able to put them all back in again. This means that we may now, at will, bring all our books to *any* floor of the library.

Furthermore, without having intended to do so, we have developed an important new economy. As compared with conventional stackage we have cut our aisle-space-to-book-space ratio exactly in half, for in our new installation there are four "thicknesses" of book storage to each aisle instead of the two thicknesses that we have in conventional stack storage. Behind each vertical row of shelves facing each aisle there is always a second concealed row of shelves that can be made accessible to the aisle by "revolving" its "belt."

We are not restricted to belt storage in the vertical plane only. Just as it is possible to have "elevator belt storage" so it is equally possible to have "horizontal

belt storage." And horizontally moving belts of sectionally-hinged, book-loaded shelves offer the theoretical maximum of compactness in book storage. For, when we have shelving moving horizontally, all *transverse* aisles can be omitted and a given cubic space can be filled absolutely full of book shelving.

Imagine then, if you will, a stack deck with a single longitudinal aisle along one end of it. Imagine flowing into, and away from, this one aisle a long series of parallel horizontally-rotating stack ranges, each one placed as close to the next as possible and each one moved electrically by push button control. With such an installation as this the entire two sides of every back-to-back range of loaded shelves could be made to pass at will a "viewing point" on the one aisle.

To enable the shelves of such a horizontally moving installation to "turn the corners" at each end of the row they would have to be cut up into a succession of short segments of shelf, each segment perhaps a foot long, perhaps less, and each segment so hinged as to swivel on its two interior corners. But such a segmental shelf construction presents no insuperable, or even difficult, engineering problems. When such a rotating range—or rotating single shelf—of books was set in motion by push button control one could stand still on the end aisle and watch a constant succession of little segments of book shelves appear from "nowhere," swing around facing one (where a shelf could be stopped by pressing a button whenever one desired to do so), and then swing around back into "nowhere" again.

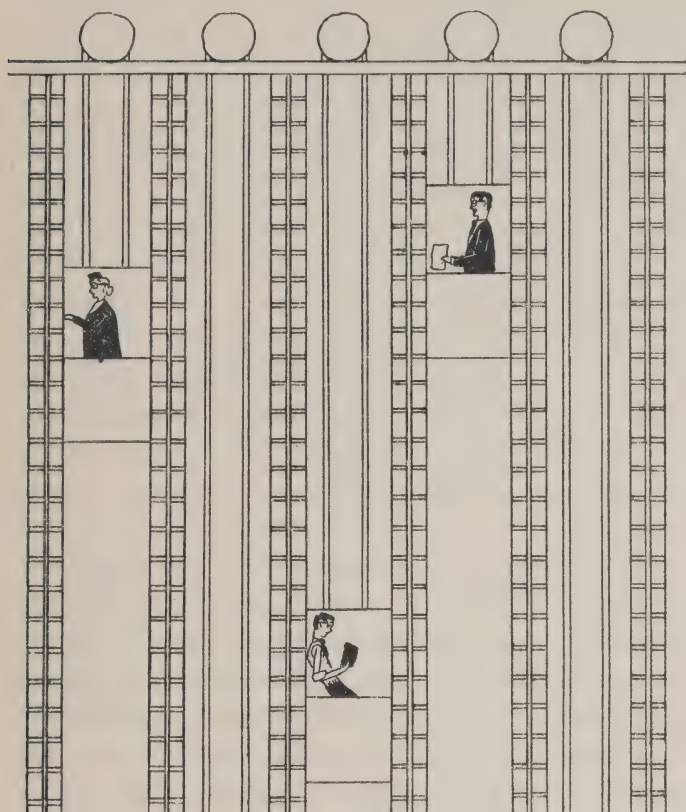
If the horizontally rotating ranges of shelving were to be set up quite close to each other (i.e. with merely an inch or so of operating "clearance" between them) about one and one-half additional stack ranges could be placed in the space occupied at present by transverse aisle space. Such a compactness would better the aisle-space-to-book-space ratio from its present sixty-five per cent and thirty-five per cent to perhaps five and ninety-five per cent. On the other hand, as compared with "elevator belt storage," "horizontal belt storage" would lose two things: it would no longer be possible to bring all of the books of the stack up or down at will to any floor, and it would no longer be possible to bring them to easy eye and hand height: we would have to go back to reaching and stooping.

Would any such a horizontally rotating stack installation be any more "practical" than a vertically rotating one? One can easily reply "no." With both of them "hinge" cost, motor and motor control cost, etc., etc., would all combine to exceed by a wide margin any saving which might be effected in the cost of the outside building "shell," the only saving that would be made. In other words what we have here is a method of book storage the only excuse for which would be found when we were faced with the problem of shelving the greatest possible number of volumes in a given cubic space, quite regardless of the cost of doing it—a conceivable problem, to be sure, but a most unlikely one.

While we are discussing the outrightly fantastic in book storage possibilities one example at least of an

entirely different sort might be mentioned. We might call it "traveling crane book storage"!

Imagine, if you will, a conventional present-type stack consisting of any number of decks, aisles and



TRAVELING CRANE BOOK STORAGE

ranges of book shelving exactly as now. Then imagine this same stack with *all* of its transverse aisle floors removed, so that its book shelving stands in tall ver-

tical tiers facing a series of long, narrow, canyon-like slits, each slit only three feet wide but many feet long and high. Then imagine, installed in *each* one of these canyon slits, a tiny elevator cage, each cage capable of holding two persons, or one person and a small book truck. Imagine each one of these cages as being equipped with some sort of push-button control that permits its occupant to move it *either* vertically *or* horizontally, i.e. either along, or up or down in, its respective "aisle canyon." Imagine each such elevator cage as being enterable by means of a door at one or its two ends at any one of the longitudinal floor levels left intact at one end of the stack aisles. Finally, visualize the sides of each cage—i.e. the sides facing its two ranges of book shelving — as being closed in up to waist height, but above that height open, so that all of the shelves, on both sides of the aisle, are immediately accessible to the occupant of the cage.

What would be the advantage of such a stack installation as this? No greater compactness of storage space in this case (except the elimination of a slight wastage of shelf space where the stack deck floors now come) but a considerably greater accessibility to the materials stored. It would be possible for any one to "call" any aisle cage to *any* floor as a "take-off" point (however uncanny it might at first seem to see it coming to one thus, "on call," across as well as up or down). Furthermore, as with "elevator-belt storage," the cage could always be brought to rest at a point that would bring the books one wanted to

look at at a convenient height—i.e. without any necessity of either reaching or stooping.

But such a stack would almost surely cost more than our present stacks because each "aisle canyon" would require its own separate elevator "cage." And this would be true despite the fact that these "cages" could be relatively inexpensive affairs, both because they would be small and also because, being two-dimensional in movement, they would require no elevator "wells." There would be the saving resulting from the elimination of all transverse stack deck floors, meaning also a considerable reduction of stack weight and so a reduction of over all construction cost. All stack lighting could be eliminated because one light in each cage would always illuminate—and illuminate exactly—the shelves being examined at the time; and all stack elevators and "conveyor" systems other than the aisle "cages." To some extent the number of aisle cages required could be reduced by a layout which increased the length of aisles and so reduced their number; but, when we lengthened them, we would emphasize the one very serious objection indeed to this form of installation: viz., that each "aisle" canyon could hold only one cage, and so could "service" only one person at a time.

So far greater cost has been referred to as though it were the only difficulty faced by all these forms of book storage involving *movement*. There are, however, other objections, any one of which might in practice prove impossibly serious. One would be *noise*; however much it were minimized it would

almost surely be a nuisance. Another would be necessity of in some way "locking in" all the books on their respective shelves. When shelves are sliding, or revolving, or turning, in any fashion, books cannot be permitted to project out beyond their respective shelf edges. If even a single book got "caught" in the mechanism it could make a lot of trouble, both for itself and for its neighbors.

So much for the fantastic: now let's get back to the practical.

CHAPTER 4

ROLLING AND HINGED STACKS

SINCE two-thirds of the cubic footage of our present form of stacks is taken up by aisle space the problem of storing more books in them might very well be re-stated as being the problem of lowering the ratio of aisle-space to book-space by increasing the number of books get-at-able from a given aisle.

There are half a dozen more or less practical ways by which this can be done. Second-hand booksellers long ago developed one of the simplest. Not infrequently, when crowded for space, they insert a subsidiary shelf for small books above and behind their main shelves, the rear shelf being raised just high enough above the front row of books for the upper part of the backstrips of the rear row of books to be "see-able." This shelving subterfuge has, however, no practical value for library storage.

In libraries all previous attempts to lower the aisle-space-to-book-space ratio have divided themselves into two classes: hinged shelves and rolling shelves. If, in front of one range of shelves facing an aisle, a second range can be placed, facing the same aisle; and, if some method is provided by which the second range can be easily moved out of the way when it is desired to get at the hidden rear range, the book

storage capacity of that side of that particular aisle has been doubled. To be sure more total space is required, but the additional space is entirely book storage space: aisle space remains the same. If such double ranges of books are put on both sides of each aisle the aisle-space-to-book-space ratio will be almost reversed.

The practical problem involved in any installation of this sort is the finding of some easy and cheap way to move the front cases out of the way and back again. In past practice, but not necessarily, this has meant moving, not separate shelves, but all of one case (or all of one double case) of shelves at once. If the case is moved straight out into the aisle, whether parallel to it, or at right angles to it, we have a rolling stack construction. If it is moved out by turning it on a pivot, i.e. if the case is swung out like a door, we have a hinged case construction. A whole case full of books is a fairly heavy load; but, if it be properly hung on sufficient sturdy ball-bearing hinges, it can be swung around to give access to the hidden case of books behind it without unreasonable exertion.

About sixty years ago there was a considerable library interest (nearly all of it abroad, however) in book storage of both of these movable types. The Library of the British Museum gave extensive publicity to the idea by making a substantial installation of rolling (or, as it called them, "sliding") cases in one of its main reading rooms. In an article in the *Library Journal* in 1891 Richard Garnett, then its librarian, described the new device and gave its precedent

background. Credit for the idea, he said, should be given to the Library of Trinity College, Dublin, to the Bodleian Library, and particularly to the Bradford (England) Free Library, all of which had had installations antedating that of the British Museum.* Mr. Garnett claimed that these British Museum rolling cases provided supplementary shelves to increase the capacity of the library without requiring *any* additional space. He omitted explaining, however, that, although this last was true in his particular instance, it was true only because the British Museum aisles involved had been inordinately wide to start with.

All the hinged cases I know about have been single sided. It would be entirely possible (though the writer has never heard of any) to make double-sided swinging cases. Instead of merely doubling the book storage capacity facing each aisle such double-sided hinged cases would triple it, thus theoretically lowering the aisle-space-to-book-space ratio to perhaps 25% and 75%. Double-sided cases would, however, be twice as heavy to move as single-sided ones, and there would be an increasing loss of book space to afford "swing clearance" at their inside corners as the tier swung around out. (This clearance loss could be wholly or partly offset by building the ends of all the

* Garnett, Richard: "The sliding press at the British Museum": *Library Journal*, Oct. 1892, v. 17, p. 422-4.

When it comes to the question of priority some swinging bookcases which I saw some years ago at the library of the University of Leyden seemed to me, from their appearance and the details of their construction, long to antedate any one of the British devices which Mr. Garnett mentions. Mr. Gosnell tells me that he saw similar hinged cases, "of obvious antiquity," at the Columbine Library at Seville.

shelves—and that means also putting all the books on them—at a slight angle).*

The weight difficulty could be helped by resting the outer corner of the book-case “door” on a swiveling caster. Or the swinging shelves could be made shorter than our present three foot standard. Each of these variations adds, however, to construction cost.

Although the writer knows of no such installation he is inclined to suspect that, all things considered, the most practical form of swinging book stackage would be one in which each shelf was hinged independently. Such shelves would require much less exertion to move; and the hinging device for each could be made much simpler and cheaper. (Independently hinged shelves might, however, demand as a prerequisite that all of the shelves in any given section of the stack were of a fixed size.)

The rolling stack idea is equally simple. If a single tier of our present stacks were to be equipped—either by suspending it on wheels running on overhead rails or by carrying it on wheels running on rails in the floor—so that it could be rolled out into the aisle we would have a rolling stack. If a close packed succession of such rolling stacks were installed on both sides of an aisle, aisle-space-to-book-space ratio would be lowered to approximately 35% to 65%—i.e. the storage capacity of our present stack cubage would be theoretically increased almost 100%.

* Since the above was written Mr. MacDonald has shown me models of hinged shelving, with which his firm is experimenting, which ingeniously provide for “clearance” by off-setting a portion of the rear tier of shelves. It provides a double-faced hinged case mounted on ball-bearing hinges and ball-bearing casters.

One has to say "theoretically" because, with rolling stacks also, we are able to draw on experience. Mr. George H. Locke, then librarian of the Toronto Public Library, which made the largest rolling stack installation of which the writer is aware, reported that, by installing them, stack storage capacity was increased slightly less than 50%. Why actual gain was so much less than theory would call for was not explained. A picture of this Toronto stack, which was built by the Snead Company, appeared in the *Library Journal** at the time of the installation, together with a picture of one other installation. Mr. Locke referred to his cases as "ridiculously easy to move," and added categorically, "so far we have not been able to find any defect in their operation."

Rolling stacks and hinged stacks have about the same advantages and disadvantages. To begin with both require a special stack construction. In our present stacks the vertical supporting columns are spaced at distances determined by what has been our conventional shelving lay-out. This means columns spaced a little over four feet apart at right angles to the aisles and three feet apart parallel to the aisles. The columns in the Snead "hung stack" (one of the first of the so-called "modular" stack constructions) are spaced about nine feet each way; but as yet few libraries are equipped with modular stacking. In

* *Library Journal*, July 15, 1931. v. 56, p. 554. Mr. MacDonald tells me that the loss in efficiency at Toronto was due to the fact that Mr. Locke thought it necessary to make his aisles wide enough to leave passing room around the ends of his rolling cases after they were pulled out into the aisle.

general we have to say, therefore, that both rolling and hinged stacking demand a building specially constructed to house it.

But with both hinged and rolling stacking we are also once more faced with the objection of increased construction costs. In the case of hinged cases these costs would be for the posts on which the front cases would swing, and for hinges and possibly for castors. For rolling cases there would be extra costs for wheels and for trackage for the wheels. Both kinds of moving stackage would require a stronger (probably a diagonally-braced) shelf construction. The only place where saving would be effected would be in the amount (per book stored) of the stack building "shell" which would be required; and, though this saving might be material, the extra cost of the stack installed in it would probably more than offset the saving. What we have here again, in other words, is a greater compactness of storage, but no over-all economy.

But there is another argument against both these forms of stacks: there would be a loss in operating efficiency. An unfamiliar bar would be interposed between the would-be book user and his books. He would be obliged, in the case of half or more of his books, to slide or swing open a "door" to get at the book he wanted. It is true that, if the door were made easy to swing or slide, the bar would be a slight one. And it is true that we could, at the start, defer a good deal of door swinging by treating all the rear tiers of such shelving as future or reserve storage capacity,

i.e. we might leave all of their shelves empty to begin with.

John Lymburn, then librarian of the University of Glasgow, advanced this last defense of them back in 1892. He pointed out* that rolling stackage was one admirably suited to provide for gradual growth. At first, he said, only every sixth case, for example, might be installed, then every third one, then every second one, and so on. Furthermore these new cases would not have to be inserted at regular intervals. Instead they could be inserted wherever special congestion developed. His point was valid: that, until a solid installation of rolling cases was made, cross aisles would obviate any necessity of moving the cases, would, perhaps, in slow-growing sections of the library, postpone moving them for many years.†

* Lymburn, John: "Suspended iron presses for book accommodation in large libraries." *Library Journal*. Jan. 1893, v. 18, p. 10.

† Melvil Dewey was another one of the early librarians much taken up by the rolling case idea; and, like everything else that he fell for, he fell for it hard, or, to use his own words, "extended to infinity and to absurdity." Theoretically, he said, we could have a stack deck packed solid with rolling cases except for the space of one single transverse aisle. He admitted that, if we had a stack deck thus packed full of cases, it would be necessary, on the average, to move one-half of all of the cases on the deck to get at the particular case that one wanted—worming one's tortuous way through a solid deck of rolling shelving! In his enthusiasm he likened such a packed-tight deckage of rolling cases to a file case full of drawers, and argued how easily one "moves" out a drawer, and then pulls a card out of it, even when the file case itself is packed full of drawers. But this Dewey analogy, plausible though it may sound at first blush, is easily seen to be an invalid one. It would be valid only if our rolling cases could "roll" in three dimensions, i.e. if there existed some way by which a library user could "pull out" a whole book case of books from its close-packed fellow cases, *without first moving any other of them*—which is what happens when one pulls a catalog card drawer out from its close-packed fellow drawers.

The Snead people, in their advertising of their rolling stacks, claimed for them the further advantages of "greater fire safeness" and "dust tightness," but these two arguments sound a little forced. Both the rolling stacks pictured in the *Library Journal* were double-sided ones. Single-sided ones would involve only half the weight and so half the labor to move. If single-sided cases ran on floor rails they would be "tippy"; but, if they ran on overhead trolleys, this difficulty would be overcome. If rolling cases are hung from above it would probably be necessary to provide against side sway in moving them; but a guide track underneath them would easily take care of this. Also their shelves would probably have to be "lipped" (a requirement, as was previously remarked, which is imposed by all moving stack installations). We would have somehow to ensure that books did not inadvertently stick out beyond their shelf edges to "catch" against the books in the next case when their own case was moved.

All of which boils down to this: rolling and hinged stack cases, which got off to such a brave start in the early nineties, failed to go any further both because they required a different spacing of stack columns (and so a *de novo* stack construction) and also because in actual practice they did not seem to be able to justify their cost and their extra trouble to use. However, we are now getting away from our long maintained tradition of close column spacing; and this, and the increased storage pressure upon us, may bring about a renaissance of interest in hinged and

rolling stacks. It might be remarked here that the compact storage proposed in this book is just as applicable to hinged and rolling stacks as it is to our conventional stacks, and that it will therefore increase *their* storage capacity the same 50% or more.

CHAPTER 5

THE FACTORS INVOLVED IN OUR CONVENTIONAL FORM OF STACK STORAGE

BACK in 1887, in the second volume of his now almost forgotten little periodical, *Library Notes*, Melvil Dewey summarizes in considerable detail the conclusions which the librarians of his day had arrived at regarding the basic factors involved in the housing of books in shelving of our conventional type. And no new data on any of these basic factors were developed until 1934-35, when there appeared two articles*, a first report and a supplementary one, in which Henry Van Hoesen and Norman Kilpatrick formulated a more comprehensive and more accurate body of information regarding book sizes than any that had been previously worked out.

Many of the conclusions which Dewey formulated regarding shelving are just as sound today as they were when he stated them sixty years ago. Regarding un-interchangeable shelving, for example, he said: "Architects design these miserable shelves, builders put them in, trustees pay for them—sometimes almost double what the better ones would cost—and the poor

* Van Hoesen, Henry B. and Kilpatrick, Norman L. "Heights of books in relation to heights of stack tiers." *Library Quarterly*, 1934, v. 4, p. 352-7; and "The heights of three hundred and fifty thousand volumes," 1935. v. 5, p. 341-7.

librarian pays for the ignorance of all concerned.”*

Take the second of Dewey's "basic factors," the height of a stack deck. Wesleyan has one seven feet, four and one-half inches in the clear, and this height, seven and one-half feet over-all, has for many years been the accepted standard. But is this the best height? Mr. Angus Macdonald, the head of the Snead Company in a noteworthy forecast,[†] says of his "Library of the Future." "A height of eight feet from floor to floor has been adopted as the standard throughout . . . instead of the formerly orthodox seven feet six inches. The extra six inches is just enough to prevent . . . study spaces . . . from seeming oppressively low." Dewey himself recommended seven feet, eight inches[‡] and Poole and Eastman eight feet. Now that newly designed methods of stack construction are at last affording librarians that flexibility in the use of their stack space which many of us have for years been advocating this question of stack height needs careful re-study.

* *Library Notes*. September 1887. v. 2, p. 104 Even in Wesleyan's relatively small library building our architects inflicted upon us no less than *thirty-seven* different lengths, sizes and styles of shelving, only a small minority of them of standard size and so interchangeable. In our stack alone there are seven different lengths of shelf, where there was no necessity whatever for more than one. (To multiply our annoyance four of these seven shelf lengths vary from each other by so little a difference that it cannot be detected by the eye, which means that these shelves have to be actually measured every time we have occasion to move one of them.) Such an absurd hodge-podge of un-interchangeability as this was, of course, expensive to install in the first place, just as it will be forever an expensive nuisance for us to use.

† Macdonald, Angus Snead: "A Library of the Future." *Library Journal*. December, 1933. v. 58, p. 975,

‡ *Library Notes*. v. 2, p. 101.

Third factor: stack aisle width. Although a great deal of money can be wasted in unnecessary aisle width this has never been a common fault in American stack construction. (Why German efficiency permitted the five foot aisles which were standard in the library of the University of Berlin, the writer never understood). Too narrow aisles, on the other hand, although they save space, are profoundly annoying to users. Our Wesleyan aisles are fifty-one and one-half inches on centers, which means (with $9\frac{1}{2}$ " shelves) aisles thirty-two and one-half inches in the clear; and this is approximately the present American stack standard. Dewey advocated thirty inches as a minimum. He would permit twenty-six inches, in the clear, in the extreme emergency—which goes a good deal narrower than most of us would. Aisle widths, like deck heights, are primarily conditioned by the human factor: height has been a question of how high the average person could easily reach, width has been a question of into how narrow a space the same person could easily stoop to examine the books on the lowest shelf.*

* Into this question of aisle width we afterward introduced an important new factor; viz. into how narrow an aisle space are we able sufficiently to turn a book truck to be able easily to get at the books on the shelves on its two sides? The shelves of the standard large size library book truck are difficult to get at in *any* aisle; the small truck can barely be turned in a thirty-six inch aisle. About six years ago the writer designed a book truck of an entirely new design, especially intended for stack aisle use. This truck, styled the "Wesleyan Stack Truck," is now being offered for sale by the Library Bureau. Unlike all previous trucks, it does not have to be turned in aisles to put books on, or take them off. We tried out a model of this truck at Wesleyan for many months before turning its idea over for manufacture, and found it gratifyingly convenient. With this truck a further narrowing of aisle width becomes entirely practicable, perhaps even down to thirty inches in the clear.

Fourth factor: Fixed vs. movable shelves. Mr. Dewey to the contrary notwithstanding, the ideal book stack will probably be equipped with movable shelves. To most present-day librarians movable shelves seem so emphatically desirable that they will probably be surprised to learn that Dewey was an advocate of fastened-in-place shelving. Why? Because for compactness of storage, he strongly advocated "sizing"; and it seemed to him that, if books are completely sized, movable shelves are unnecessary. He had another good reason: when he wrote steel shelves and steel stacks were unknown, and it was true of wooden construction, as he argued, that fixed shelves afford a greater strength and rigidity at less cost.*

However, given modern steel construction, the flexibility of movable shelving will probably always be desirable—regardless of how much a library may "size." For at any time it may wish to change the "break points" of its "sizing," and it will surely want, from time to time, to change the stack location of its sizes. Furthermore, if it be blessed with "modular" construction, it will be likely to want, on occasion, to take all the shelving out from some part of its stack to convert the space to some other use.

Section five of Dewey's fundamentals concerned itself with the design and dimensions of the individual shelf. Compared with the crude, expensive, inflam-

* In his discussion on this particular point there appears one sentence that is noteworthy because it is one of the very few occasions when Dewey appeared to give a hang for mere "appearance." "Uniform appearance," he says, "is much helped by fixed shelving, in which the lines run with perfect regularity."

mable, sagging, poorly supported wooden shelf of Dewey's day, the steel shelf of today's stacks, whether it be the bracket, the slide, or the notched type, is a wonderful advance. Bracket shelves, as they are now designed, have, however, one serious fault. Between any two shelves backing each other stack designers have left two inches of empty space. This space *can* be wasted and they seem to have assumed that it always will be wasted. But why waste so many millions of cubic inches of valuable stack space?*

Dewey does not mention thickness of shelf but the question of how thick a library shelf ought to be is anything but a minor detail. At present all steel stack shelves are made from five-eighths of an inch to seven-eighths of an inch thick. This thickness is a sheer copying of wooden shelf precedent, for, if the shelf were properly re-designed, any such a thickness as this would be quite unnecessary. It may seem that a quarter of an inch too much in shelf thickness isn't

* The exact point involved in this question is this: that this center space is not fully usable unless the shelf *posts* are so redesigned as not to encroach upon it. At present it frequently happens that a given width of shelf (plus half its center space) would be fully wide enough to take care of a given set of books—*except for the two volumes coming at the ends of the shelf*. For these two volumes there is no center space because the shelf posts occupy it. To meet this difficulty our "Rules for Stack Care" in our "Staff Manual" have this to say: "Take special care to 'ease in' large books which come at the end of shelves, as the back edges of these books are liable to get caught on the projecting stack uprights. If they do, the books at the ends of the shelves stick out into the aisle, and their bindings are liable to become badly warped." If stack pages were always careful to follow this rule, and if students and faculty were also aware of it, we would not have what we do have all through our stacks, viz. end-of-shelf volumes sticking out into the aisle to make an unsightly appearance, to get hit by book trucks, and to get their cover hinges broken and their covers warped.

worth bothering about; but the multiplication of this quarter-of-an-inch by tens of thousands of shelves amounts up to a rather staggering waste. Steel shelf thickness was not designed for strength *per se*, but rather for stiffening (i.e. to prevent the shelf's sagging). It would, however, be perfectly possible to re-design steel shelves in such a way as to give them all the stiffening they need to prevent sagging and yet to have them not much, if anything, more than a quarter of an inch thick.

This could be accomplished by any one of several possible methods, or by a combination of them. One could be to depend for stiffening mainly upon an "apron," either down-extending or up-extending, turned at right angles to the shelf along its extreme rear edge, "extreme rear" in this case meaning at a point just short of the center line of the open space which now exists between the rear edges of our present shelves. Such an apron, one or two inches wide, plus a very slight beaded roll along the front of the shelf, would provide all the anti-sagging "bracing" it would require. Furthermore such an apron as this would serve two very useful supplementary purposes. It would be an efficient "back stop," that is it would prevent what is now a continual problem with all of us, the dropping of small books through the unguarded open space back of our shelves. Such books may be lost for years. Because our own stack decks also are not solid, books with us drop down through several decks—with disastrous effects upon their bindings! The "apron" would also prevent too

wide books on one side of a tier pushing "out" books on the other side and would otherwise assist in maintaining book alignment on the shelf.

At this point a still more radical change in shelf design should perhaps be mentioned, an idea which the writer has been intrigued to do some experimenting with for several years. It would seem to be at least possible that we are at present making all our stack shelves upside down! Because steel shelves followed wooden shelves we have always taken it for granted that the bend of "stiffening" provided for them along their front edges has to be a down-hanging one, whereas it could just as easily be made a turned-up one. And it is possible that such a turned-up fold or "lip," on the upper side of the shelf, particularly if it were, as above suggested, a mere beaded roll, would provide us with a shelf much more effective than our present one. A turned up edge would tend to prevent our books from sticking out into the aisle, i.e. would automatically help keep them in alignment.* The objection to such a turned-up shelf lip is, naturally, that it makes it slightly more difficult to pull a book off the shelf. This objection is to some degree offset by the fact that it makes it slightly more easy to put it back there!

When we come to the last of Dewey's shelving factors, viz, the vertical spacing allowed between the

* This alignment of books on the shelf is much more than a question of esthetic appearance: it is important practically because it makes the reading of back strips and call numbers, and so the finding and replacing of books, much easier. At Wesleyan our "Rules for Stack Care" instruct our stack pages to "police" our shelves continually for both book uprightness and alignment. We find it labor well spent.

shelves, and the width of the shelves, Van Hoesen and Kilpatrick have, as has been already said, provided us with a mass of valuable data which Dewey did not have, they having worked out the proportionate number of books which, in any large research library, are going to fall into each size class. In their preparation for their first article they actually measured one hundred thousand of the volumes in the Brown University Library, and for their second article they secured similar size data on no less than 350,000 volumes. Percentages based on so large a count as this may be taken as reasonably conclusive. Here they are, slightly amended (for reasons that will appear later) by translating them from centimeters to their nearest inch equivalents:

5 x 8 inches (or less)	25%
6 x 9 "	29%
7 x 10 "	25%
8 x 11 "	11%
9 x 12 "	4%
10 x 13 "	3%
Over 10 x 13 inches	3%
	<hr/>
	100%

Make a note of these percentages: we will come back to them later.*

* While we are on this subject of fixed vs. movable shelving, reference should perhaps be made to a new form of steel "sectional" shelving for library use which the writer developed a dozen years or so ago. We here at Wesleyan have found these sectional units so useful in filling all sorts of temporary auxiliary requirements that we keep over eight hundred of them in constant use. The idea behind them was a simple enough one: it was nothing more or less than the old wood "sectional book case" idea re-created in black enamel sheet steel, so stamped out

that the shelf "units" automatically lock themselves together vertically. Each "unit" is 36" long, 11" high (in the clear) and 9" deep. Each vertical tier of these units has a separate inter-lockable "base" and "top." Tiers can be built up to any height desired, can be set up back to back, or in ranges of any desired length, and can be locked together horizontally (with no tools except one's fingers) into solid, free-standing cases. They are so designed that they can be set up and taken down with astonishing speed. We here at Wesleyan can, and frequently do, "shelve" all four walls of a fairly large room in an hour. Furthermore, because this shelving has a smooth solid back, it makes, of itself, excellent temporary partitions for carrels, studies, offices, etc. Small installations of it can be set up on tables, on the backs of desks, under stairs, and in all other sorts of odd corners—only to be removed just as quickly when the need for it is past. These "sectional" steel units were manufactured for us by the Sneed Company. They cost slightly more, per shelf, than free standing bracket shelving; but they can do many things that it cannot do.

Synthesis

CHAPTER 1

MORE COMPACT STORAGE IN OUR PRESENT STACKS

BACK now to our present stacks, having meanwhile run over the various factors that make them what they are, we are ready to ask ourselves this very practical question: is there any way by which we can change some one (of more) of these factors to make more efficient these conventional stacks of ours, as *they at present stand in thousands of existing libraries?* When we say here “more efficient” we mean capable of holding more books, and not a few more books but a great many more. A dozen years ago, when the Wesleyan library was being faced with so rapid an inflow of books that it was threatening to swamp our existing storage facilities, the writer asked himself this same question; and asked it in this concrete form: what, if anything, could be done that would add *at least 50%* to the book storage capacity of our Wesleyan stacks, *and would add that much additional capacity without any structural building change and without any other expense that could not easily be met out of current library income.*

It was immediately clear that there was one thing that we could do—if we wanted to. We could gain at least a part of what we sought, i.e. a much more compact storage right in our existing stacks, by go-

ing back to one of the basic shelving dicta of the "founding fathers" of the library profession, and arranging our books on our shelves first of all by *size*.

We had only to look at almost any shelf in our then almost entirely unsized library to see that such a rearrangement would result in a very considerable increase in our storage capacity. We were then segregating only bound newspapers and other very large side-lying folios. If one of our other shelves happened to have on it twenty books seven inches high and a single book twelve inches high—and this was by no means an infrequent situation—it was clear that the height space and the width space occupied by all the books on that shelf were set, not by the twenty small books but by the one large book. And this meant that, of the four thousand or more cubic inches occupied in the stack by that particular shelf and its contents, nearly three thousand cubic inches—i.e. nearly three-fourths of its space—was vacant air, completely wasted. If such a waste as this were being made by only one shelf it would be inconsequential, but it took very little counting to see that, with us, it was being multiplied by many thousands of shelves. It became evident, in other words, that "sizing" could be made a very significant factor indeed in attaining for us a more compact book storage.

In this matter of sizing we had been little different from other libraries. Probably all libraries do what we used to do, i.e. they segregate their newspapers and other large folios. Most libraries probably shelve their smaller folios also in a separate shelving order.

But, if the writer's observation provides a valid consensus, very few libraries follow the sizing rules which we were taught back at the New York State Library School, calling for a separate shelving for quartos; and, so far as I know, there is only one large library in the whole world, the Bibliothek für Weltwirtschaft, which follows "sizing" to its logically consistent conclusion (i.e. which arranges *all* of the books on its shelves first of all in order of size).^{*} It has been rather carefully computed that a complete "sizing" of all the books in a large library which had previously been doing no sizing at all would, without any other change whatsoever in its storage techniques, increase the capacity of its present stacks by about twenty-five per cent.

Why then have most present day librarians gone such a very little way in adopting "sizing" as a storage economy? Most probably because a first classification of books by size seems to them to go counter to another long accepted fundamental practice, viz. that a library's books should be arranged on its shelves in a classified order by subject. This subject arrangement of books—or, as Dewey called it, a "relative location" arrangement, as opposed to the "fixed location" arrangement for them which had been almost universal library practice up to his day—was perhaps his most important single contribution to library methodology. He not only proposed it, he argued for it and fought for it with the almost fanatical

^{*} Mr. Gosnell tells me that the Escorial Library, in Madrid, also completely sizes.

zeal that was the outstanding characteristic of the man. As a matter of fact Dewey's basic subject arrangement concept was much more significant and far more revolutionary than the concrete embodiment which it took in his Decimal Classification.

What we have been prone to overlook, however, was that Dewey was not really a fanatic but was, instead, an intensely practical individual. So, although he believed, and believed intensely, that a library's books should be arranged in some sort of a classified order, he never for a moment thought, or preached, that they had to be arranged in one single classified order. He saw no objection whatever to having them arranged—and arranged by size—in two or three or four separate classified orders. In fact he strongly advocated just this multiple arrangement and he did so because he knew that a first arrangement by size meant a 25% to 30% saving in over-all storage cost.

All of which means that, for three generations, we have—most of us—been perverting the “true gospel” of relative location. We have exaggerated the importance of storing all of our books theoretically in one single classified order. And the proof that we have exaggerated it is to be found in the fact that we have had to insert the qualifying word “theoretically” in our last sentence. In reality no library of any size whatever has that single classified order that it may state, and even think, that it has. For one thing, as has already been pointed out, all of us really do *some* “sizing.” But there are other separate arrangement “orders”—and in most large libraries there are a great

many of them. All college libraries have separate "reserved book" collections, many of which are call-numbered and shelved independently. Most college libraries have browsing room collections or their equivalent, seminar or departmental or divisional libraries, "memorabilia" room collections, etc., etc.

We here at Wesleyan are an excellent example of theory vs. fact. Theoretically we had, up until four years ago, been arranging all our books in a single classified order; if any one had asked us, we would have assured the inquirer that we were a one-order library. Yet even then less than two-thirds of our entire holdings were arranged in that one main classification order. The other third were scattered around in no less than twenty-eight separate, specially call-numbered collections, some of them very small, some relatively large. In other words the actual practice of the Wesleyan library, despite its theory to the contrary, was such that there had never been any "one place to look" to learn what our holdings were except the card catalog. And one may venture that this vast discrepancy between arrangement theory and arrangement fact is the actual situation today in almost every large library in the country.

On the other hand it is undeniably true that the more any "open stack" library splits up its holdings into separate shelving arrangements the harder it makes a "browsing" use of its facilities. At this point however, it is important that we recall the kind of library that this little book is talking about. We must remember that in all its discussions it is concerning

itself solely with the storage of little used research materials. Such materials are not usually sought or found by browsing. Undergraduates browse, and they should be encouraged to do so; but most graduate students and faculty members come to the shelves with specific demands. They want definite items. Furthermore many research collections are "closed stack" ones, not welcoming the browsing type of reader; and it is obvious that *if* access to a collection of research materials is to be gained by most would-be users of it only through the card catalog, it makes very little, if any, difference to these users whether the collection is stored in one classification order or in two or three.*

I think then that we may fairly set up as an initial premise that, *for little used research materials*, "siz-

* It would be *possible* to retain most of the efficiency of "sizing" and a large portion of the advantages of classificational contiguity in the stacks *by a ribbon arrangement of the various book sizes* rather than a remote segregation of them. For example it would be possible to maintain *approximately* the proportionate space occupied in the stack by books of the various sizes, if in each individual stack case we arbitrarily allotted the two upper shelves to a combination of 5" and 4" books, the next three shelves to 6" books, the next five shelves to 7" books, and the bottom shelf to a combination of 9" and 8" books. Of course the relative number of books in these various sizes varies considerably as between one class of the classification and another so that, under such a "ribbon shelving" arrangement, the material shelved on all these differently sized shelves would seldom, or never, run absolutely *pari passu*; but the same sub-sub-sections of the classification would probably usually under-run or over-run each other by only a few cases and never by more than an aisle or two. Certainly all the material in each subject field could (with perhaps a little "jockeying" of shelving sizes at key points) be kept together on a given stack deck. It is true that such a ribbon arrangement by size would be so contrary to both reader habit and shelving practice that (at the first at least) tangles would be likely to develop. But, for all that, the possibility of such a cutting of the Gordian knot of "sizing" is an intriguing one.

ing" is a practicable, and an important, storage economy. But sizing at best effects only around 25% saving in storage space, and we started out, you will remember, by setting as our goal an increase of "at least 50%" in the capacity of our present stacks. Is there anything else that we might do?*

* Two recent correspondents of mine have become so much convinced of the advantages of sized location over straight-run relative location that they profess to be toying with the idea of going "all out" against relative location, i.e. of reverting in their libraries to the fixed location shelving practice of a century or two ago. And the main reason they give for considering such a completely revolutionary proposal is still greater economy of space.

Whatever reasons there may be, however, in favor of "fixed location"—if there are any!—this greater economy of space which fixed location is supposed to possess is an entirely illusory one. It is true that in fixed location shelving each shelf used is filled full. But reserve space for growth has to be left somewhere. And the gross amount of that reserve space is identical in its capacity whether it be divided up into thousands of little gaps at the end of each shelf (i.e. relative location shelving) or left somewhere as a completely empty deck (or decks) (i.e. fixed location shelving).

Furthermore there are enormous practical advantages in relative location: it would be rethreshing very old straw indeed to try to repeat them here. I never myself saw a large fixed location library; and we are so remote from them now that it is difficult for us to visualize the practical techniques that had to be followed in their use. As a matter of fact I myself doubt whether an absolutely fixed location library existed even a century ago. I suspect they were all obliged to make relative location compromises. I can imagine, for example, no more aggravating a mass of books to handle—I was tempted to say "mess" instead of "mass"—than those in a shelving methodology having all of a library's continuations arranged in a accessional fixed location order. To have, for example, one hundred volumes of a periodical scattered all over the library on one hundred different shelves would seem to be very much in the nature of a shelving nightmare.

CHAPTER 2

EFFECTING A MORE COMPACT BOOK “PRESENTATION”

IN ONE of his earlier papers the writer pointed out that the “limiting factor” in the amount of book storage possible in our existing stacks was the number of books “presented” to the library user in the two vertical planes facing the sides of each stack aisle. Our storage problem could therefore be restated in these terms: what, if anything, might be done to “present” a greater amount of stored book to each running foot of aisle length. Note that the crucial word here is “present.” As was remarked a while back, stacking up books in solid piles would “store” a great many more of them in a given cubic footage of space; but such a piling up clearly does not permit each book to be easily get-at-able. Hinged or rolling cases add additional layers of books on either side of our aisle space, but in both cases only half their books are immediately “presented.”

Both rolling and hinged cases endeavor to present more books to a given footage of aisle length by increasing the area of vertical plane surface facing on the aisle. But it is evident that the same net result could be attained in another way. We may increase the number of books presented in the plane surface we already have *by reducing the relative amount of*

space which each book now occupies in that plane. The long first step in this alternative direction was taken when, way back in the "cradle" (incunabula) days of book making and book storage, the practice was begun of lettering the titles of books on their back edges so that they could be stored edgewise on shelves instead of flat-wise.

Once our problem has been thus reanalyzed a possible further step in shelving compactness suggests itself. For six centuries we have been using a form of book storage based on an edge-wise "presentation" of our books. But we have never, through these six centuries, reached the possible maximum of compactness in this form of storage *because we have always shelved our books with their long edges, instead of their short edges, in the vertical plane.* We had a very good reason for doing this: their back strips provided a good surface to mark on. But from a storage standpoint back edge presentation is not the most efficient one. Most books are made in a ratio of width to length that is somewhere around five to eight, and this ratio means that, if we could find some practicable way to shelve our books with their short edges "presented" to the aisle, we would, theoretically, increase the storage capacities of our present stacks another 60%.

About this idea, considering it simply as a fundamental statement of fact, there is, of course, nothing new. Librarians have always been perfectly well aware that books shelved in a turned down position take up less shelf space than books shelved vertically.

As a temporary expedient all of us have occasion, almost daily, to turn some of our books down in this way. But this turning down has always been a purely temporary expedient, and it has always been temporary because, once our books were turned down, they were "blind," i.e. in their turned position we could not tell what they were. To shelve a book permanently and regularly in a turned down position it is obviously necessary that it be easily identifiable. In other words we must in some way mark the short edge "presented" with the book's title, or its call number, or with some other symbolization telling us what it is.

To place an identificatory marking on a book's bottom edge sounds like a very simple and easy problem. And for some books it *is* easy. We tried the electric stylus; we tried printers type; we tried rubber stamps. All these gave impossibly expensive and impossibly smudgy results. Thin books gave inadequate space for lettering of any sort and any sort of type-set marking was hard to fit into varying widths of book. But we also tried pen and India ink and found that, with a little practice, these gave a very satisfactory result with about two-fifths of our books.

But what of the three-fifths which had recalcitrant bottom edges, surfaces that defied any sort of marking? At best the "rounding" that is an accepted part of the binding process tends to give the trimmed edges of bound books a corrugated texture. At the worst we found ourselves confronted with badly soiled edges, sprinkled edges, gilt edges, and uncut edges. On these

books we tried various forms of slipped-on label cards, labeling sheets wrapped over the "presented" ends of the books, and other similar devices. All of them got lost, or torn, or illegible—almost overnight.

What we needed for a lettering surface was, of course, a clean, freshly-trimmed edge. Such an edge would take our India ink lettering perfectly. But how to get it? It was easy enough to take such books as did not have a letter-able edge, put them under the cutter in our bindery, and shave off enough of their bottom edges to give us the fresh even surface that we were seeking. But guillotine cutter knives are unfortunately not selective! When they shaved off the book's bottom edge they simultaneously clipped sizable slices also off its covers—and the mutilated appearance resulting forbade the wholesale application of any such technique.

Then we had a first constructive idea. We sent one of our cutter knives back to its manufacturer and had it chopped up into three sections, making three little cutter knives each about a foot long. We bolted one of these short knives into place in our cutter. Now, with a book placed in the proper position (i.e. with its covers turned back) we could take a thin shaving off its bottom edge without any cropping of its covers. It is true that this "bottom cropping" left an uncropped triangle on the bottom inside corner. And it is true that bibliological purists would call even the cropping of the bottom edge of a book a mutilation of it. (But, for that matter, just about everything that a library does to its books—

plating, ownership stamping, call-number marking, page cutting, rebinding—are, from the book collector's standpoint, mutilations!) In any event we adopted this "short knife" "bottom cropping," as we call it, as one of the two alternative techniques with which we prepare otherwise un-markable books for compact storage.

It might be interjected at this point that in a very few cases—not over 3% of all books cropped—we "full crop," i.e. we trim a *wide* slice off all three edges of the book, covers and all. We do this only in the case of books having inordinately wide margins and no more than nominal value. This in practice means mainly government documents, society reports, and the like. Our theory in treating them thus roughly is that it is expensive enough to store the *texts* of such materials: and that we have no very good reason to store forever a lot of accompanying waste paper. In many cases we can crop a 9 x 12 inch book down to 7 x 10 inches and still leave page margins entirely adequate so far as the reader's use of the book is concerned. This reduction in its size means that we have gained a perpetual saving of 30% (which means perhaps *five cents a year*) in the storage cost of the item.* (We find that it adds to the appearance of these full-cropped books—and also, when they

* Some of my correspondents found no objection to the comparatively slight "mutilation" of "bottom cropping" but held up their hands in horror, figuratively speaking, at this idea of "full cropping." I can only say that, if they saw how few books received this treatment, the sort of books that received it, and their before-and-after appearance, they would drop their hands!

are cloth-bound, prevents a pulling away of the cloth at their corners—to run them through a round-cornering machine after cropping them).

But “bottom cropping” takes care of only about a fifth of our compact storage material. Two-fifths as previously stated, we can mark “as is.” For the remaining two-fifths, for various reasons which will appear, we use a different technique: we “box” it.

Ever since the making of books began book owners have made, or have had made, protective book containers sized to fit exactly the book to be stored in them. These have been variously called “slip covers,” or “solander cases,” or simply “boxes.” When these containers are made to protect books which are real treasures they are often themselves beautifully and expensively made. Usually, however, they are inexpensive pasteboard affairs. Such cheap “boxes,” made of paper covered paste board, are our third alternative method of providing a bottom marking for compact storage materials. They are, of course, made “end opening” (i.e. *one of their short ends is “presented” to the aisle*) and on this short end we affix a label showing, as we do with all compact storage materials, short title, author’s surname, and call number.

The material that we box consists mainly of items for which the protection of boxing is of itself desirable. For example we box all material which came in to us unbound, for which we do not anticipate a sufficient amount of use to justify the expense of binding. Unbound little-used material has always been one

of the librarian's greatest problems, particularly where it consisted of a series of small units, independently printed, but demanding to be kept together. Every large research library has hundreds of thousands of such physically separate but bibliographically associated pieces. They are what the librarian calls "continuations," coming in to him in an endless variety of sizes and forms: periodicals, government documents, corporation reports, house organs, society transactions, etc., etc. For this material binding, even aside from its cost, has never been the perfect answer. One reason has been that a large proportion of it lacks scattered issues: which means either that it must be bound up incomplete or that its binding has to be delayed, perhaps for years, perhaps forever. Also most of it is "open end" in character: which means that the last portion of it always has to be shelved somewhere unbound for a time.

So far as Wesleyan is concerned, we now consider this problem of the "binding" of continuations solved: we pack practically all of the less used of this sort of material snugly into our compact storage boxes. This does not mean that we are ceasing all binding. For some sorts of material boxing would never be as satisfactory as binding; but for little used research material that we expect to be called for, on the average, not oftener than once in two years — boxing is adequate. And not only is it a protection secured for about one-tenth of the cost of binding; it is a protection which at the same time prepares the item completely for compact storage.

The second category of material for the storage of which we turn to boxing consists of those books, already bound, the binding of which is in such poor condition that we deem it unwise to put them on the shelves without some further protection. "Unwise" assumes, of course, that we do not want to rebind. We may not want to because we do not think that prospective use will be heavy enough to warrant the expense. But also we may not want to because the item involved is old or rare and we want to preserve the bibliological flavor—the "integrity"—of the original binding. Every large library has thousands of fragile old books of this sort, books that welcome the protection—against dust, abrasion, and careless handling—of one of our compact-storage boxes.

Third: not invariably, but generally, we box all compact storage books which, because they are very small (less than four inches high), are liable to get out of place on the shelves.

Fourth: not invariably, but generally, we box those compact storage books which are so thin that their bottom edges are not wide enough to mark anything whatever on.

Finally, Fifth; we use our compact storage boxes as catch-all receptacles for all sorts of miscellaneous material which in the past we haven't known just what to do with. Every library is bothered with this sort of stuff: newspaper clippings on special topics, single numbers of newspapers which for some special reason it is desired to preserve, manuscript materials, folded maps, sheet music, pictures and prints, various

sorts of college memorabilia, etc., etc. No matter what this material is it has at least one common denominator: it can be put into a box! And, once it is safely put away into one of our compact storage boxes of the proper size, it can be duly cataloged, labeled and shelved.

Speaking of labeling it may be queried how we distinguish our less used "compact storage," material from our active, or undergraduate, material so far as call-numbers are concerned. We do it very simply indeed: by a single Arabic numeral, denoting size, prefixed to our regular classification letter symbols. We have six compact storage sizes, viz, "4," "5," "6," "7," "8," and "9." These sizes represent turned down book heights (i.e. book widths) in inches.

CHAPTER 3

THE RELATIVE ECONOMY OF "COMPACT STORAGE"

TO learn what saving is effected by compact book storage it is necessary first to have the answers to two preliminary questions: 1. what does conventional book storage cost? and 2. what does it cost a library to transfer its books from conventional to compact storage?

Back in 1934-35, when we made the Wesleyan cost accounting study which was the basis for the writer's *Library Quarterly* article on cost accounting for libraries, we found that it was costing us, on the average, approximately eight and one-half cents per-volume-per-year to store our books in our stacks.* These costs included, of course, interest on the investment in our stack building and stack, and depreciation and insurance on them. They also included carefully computed allowances for stack heat, light, power, janitor service, etc. These book storage costs of ours were at the time slightly above the average of costs in other libraries because our stacks happen to be housed in an exterior building shell which, for special reasons, is an unusually expensive one. In this we are not unique: a good many other library stacks are more expensively built than their functional

* Rider: Library cost accounting." *Library Quarterly*, Oct. 1936. p. 376.

purpose requires. Whether the functionally unnecessary expensiveness of the stack shell is a proper component of book storage cost is, of course, a fair accounting question. In any case, however, it is doubtful, whether in *any* stack of standard fireproof construction pre-war book storage costs were less than seven and a half cents per-volume-per-year.

We have available no exact up-to-date book storage cost figures; but, since pre-war days, library building cost has almost doubled, library stack construction cost has roughly doubled, janitorial service cost has almost doubled, and so on. It is probably safe to estimate that book storage today, in a standard stack built and serviced at today's prices, would show a cost not much, if anything, less than fifteen cents per-volume-per-year, and that completely fireproof "warehouse" storage, built and serviced at today's prices, would show a cost not much, if anything, less than ten cents per-volume-per-year.*

Now for the cost of making the transfer into compact storage. It involves two sorts of expenses: several library operational costs, like lettering, boxing, and re-marking call numbers, and one library building cost, viz. the cost of the additional shelves which the greater compactness of storage provides for.

* In the New England Storage Warehouse storage costs have been, we are told, four and one-half cents per-volume-per-year. This building was, however, built at pre-war costs, and is, intentionally, *not* standard in many important respects. (Its aisles are extremely narrow; its deck heights are such as to require step ladders or steps to reach their upper shelves; its shelving is constructed not of metal but of wood, and of wood of the very cheapest grade and form at that; its lighting is of a very simple "warehouse" character, etc., etc.)

First the operational costs. Of the material requiring no preparation other than "bottom marking": the cost of this lettering, done by hand, naturally varies greatly as between one volume and another, depending on the amount of wordage involved. On the average it costs slightly over three cents a volume.

The preliminary "bottom cropping" operation, for those volumes that require it, to provide a smooth surface for lettering, costs us on the average, slightly under two cents a volume.

Now for boxing costs. The labeling of the boxes, done by us on a typewriter, costs about the same as bottom lettering. We use thin labels specially printed up for us in strips provided with tinted identificatory borders. We type a whole strip at once and then cut off sections of it to exact box "backbone" width. To make our labels easier to read we use for our typing a variable spacing Electromatic typewriter; but this is an extra nicety. Besides this labor cost all material boxed involves, of course, another, and relatively large, item of cost, viz. the boxes themselves. We have had our boxes made especially for us in wholesale quantities. Because it is essential that each book "fit" its box exactly (so as to have no waste space left in it in any direction) we carry in stock a large variety of heights and widths. To be specific: we buy our compact storage boxes in six heights (viz. four, five, six, seven, eight and nine inches),* *height meaning book*

* We also have boxes twelve inches high and fifteen inches high which are used occasionally to take care of "over-size" material; but these are *not* turned down.

width, remember, so far as the book that goes in the box is concerned. Each height comes in fifteen different widths, by quarter inch intervals from one-half inch up to four inches. This makes ninety sizes of boxes altogether.*

It seemed to us that it might be helpful if we used a different color of box for each size: i.e. four inch boxes black, five inch ones green, six inch ones red, and so on. This variation in color may be validly criticized as unnecessary, but it adds nothing to cost and helps a little in the sorting of empty boxes and in the sorting of material for shelving.

The purchase cost of these boxes varies greatly with their size, the largest boxes costing several times as much as the smallest. Cost *per box* does not mean cost *per volume boxed*, because we frequently get two, three, or even five or six, slender volumes into a single box.† Furthermore, because we use a great many more small boxes than large ones, our actual net box cost, per volume boxed, has averaged less than seven cents.‡

Finally, in the case of material transferred from regular to compact storage, there is a call numbering

† We, of course, combine volumes in one box when they belong these measurements are outside measurements.

We, of course, combine volumes in one box only when they belong together bibliographically, i.e. when they constitute a "set", or a part of a set. We do not put a hodge-podge of titles in one box.

‡ This cost is, however, too high. Produced in large quantities these boxes should be considerably cheaper.

cost, for each transferred book's number must have prefixed to it a compact storage size number, and this means that all of the catalog cards for the book must be "searched" out of the catalog and the call numbers on them also similarly changed. However, because we have transferred into compact storage a great many long sets, which oftentimes involve only one set of catalog cards for scores of volumes, this call-numbering cost has so far, for us, averaged less per volume than four cents. (It has required the part time of one clerical assistant on our cataloging staff.) A large part of the material we have been putting away into compact storage has been newly accessioned material, which of course, involved no *re*-call-numbering.

Adding up: All our operational costs for transferring books from regular to compact storage have totaled, on the average, just under nine cents a volume.

Besides the above library operating costs, there is the one library building cost—for extra shelves. Books in turned down storage take just as many linear feet of shelf space as they ever did. Their saving in storage space results from the fact that, when they are turned down, they require less vertical space between shelves, which means that the number of shelves in every range can be increased.*

As to exactly how many more shelves compact storage accommodates the following has so far been

* It should be noted, in passing, that we use a progressively wider shelf for each progressively larger turned down size, so that each "size" exactly fits its respective shelf.

our experience on this particular point here at Wesleyan.

	<i>Number of Shelves to the vertical case</i>	<i>Proportion of each size of shelving to total shelving</i>
Present conventional stack storage	seven	—
<hr/>		
Turned Book Storage		
Nine inch (wide) books	eight	4%
Eight inch (wide) books)	nine	8%
Seven inch (wide) books	ten	36%
Six inch (wide) books	eleven	32%
Five inch (wide) books	twelve	15%
Four inch (wide) books	fourteen	5%
		<hr/>
		100%

It will be observed that our figures vary somewhat in their details from the Van Hoesen-Kilpatrick figures. There are two reasons why they do. Our figures above are not, like theirs, for all books, but only for those books which we put into compact storage. For example the 7"x10" classification is heavily "loaded" with state and federal document sets. Also please note that the Van Hoesen-Kilpatrick percentages are for volumes while our percentages are for shelves—and larger books *tend* to be thicker books!

Averaging all book sizes: compact storage gives space for approximately 50% more shelves. If we estimate twenty-five volumes to each three foot shelf and take the present average cost of a stack shelf at \$2.00 then the additional shelf cost of turned book storage works out to slightly over five cents a volume.

This gives us a total transfer cost (average per volume) of between thirteen and fourteen cents.

Now we come to the final question: does the saving effected by compact storage justify this transfer cost?

According to our Wesleyan experience we have, by the combination of "sizing" and "turning," succeeded in increasing the capacity of our existing stacks by nearly 60%. This means that we have, through it, reduced our per-volume-per-year storage cost from approximately fifteen cents to approximately nine cents.

With a transfer cost of thirteen cents, and an annual saving in compact storage cost of six cents, it is evident that it will take approximately two and one-third years of compact storage saving to recover our initial "transfer" cost. After that we will be "on velvet," and will save six cents per-volume-per-year indefinitely.

Six cents per-volume-per-year may not sound like much. Better to realize its importance, however, let's recite it in terms of our experience here at Wesleyan. When we, two or three years hence, will have completed our initial program of gradual transfer into compact storage we expect to have 250,000 volumes shelved in this way: that will mean a perpetual annual saving to us, on the books stored, of approximately \$15,000 a year. \$15,000 is almost one-quarter of our total annual budget.

Or put it in terms of our building situation here at Wesleyan. Our original building was built in 1931. The stack portion cost \$180,000 and had ap-

proximately 235,000 volumes of conventional storage capacity. In 1942, with over 350,000 volumes housed in the library and our original stack impossibly overcrowded, we built an addition to it costing \$165,000 and providing for approximately 190,000 more conventionally shelved volumes. Both of these buildings were built at pre-war costs. As our new stack was reasonably full as soon as it was completed, and as we were all this time adding to our library holdings at the rate of about 15,000 volumes a year, our stacks were again beginning to become seriously overcrowded when, in 1947, we decided upon our present program of compact storage segregation. We are leaving the undergraduate library, in its conventional storage, on Decks 1, 2, and 3 of the stack (which are the decks even with the main floor and immediately above and below it (i.e. the three most accessible decks), and are putting our research materials into compact storage on the five upper decks. The three undergraduate decks have a conventional storage capacity for approximately 180,000 volumes. The five upper decks had a conventional storage capacity of approximately 225,000 volumes: they will have a compact storage capacity for approximately 370,000 volumes.* In other words even this much change in our storage methodology would take care of the library's growth, if it were now continuing at its pre-war rate, for about ten years, and so would defer further new stack building that long for us.

* If fully used for book storage. Our bindery now occupies half of one deck.

But, on the one hand, our growth is not at present continuing at its pre-war rate, and on the other hand, we may eventually decide, after our preliminary trial of it, to carry segregation further than our initial programs calls for. The main floor deck of the stack would alone hold approximately 65,000 conventionally shelved books. If we added to these 65,000 the volumes shelved in the reserved book room, the reference room, the browsing room and the seminar libraries, we would have a total undergraduate library, all conventionally shelved, of approximately 110,000 volumes. Many authorities claim that 110,000 volumes constitute an entirely adequate undergraduate library, and the writer is inclined to agree with them. (The Lamont Library at Harvard plans to have for its undergraduates only 90,000 volumes).

But, if we carried our compact storage this much further, i.e. if we devoted only our main deck to conventional book storage, and turned over two additional decks to compact storage, we would, by this change alone, add another 80,000 volumes of storage capacity to our present stacks, i.e. we would provide for an additional $5\frac{1}{2}$ years of growth, at our normal pre-war rate.*

But, as we have already said, our present growth rate at Wesleyan is, and has been since 1942, far below its pre-war average. Without going into all the

* If we should go a step further, i.e. if we should remove all non-library facilities from the library building and permit all the space in it to be used for library purposes, we could secure compact storage space for 130,000 more volumes (i.e. for still another nine years of growth at normal pre-war rates).

computational details this can be said: that whereas, under the conditions obtaining six years ago, we had almost reached the book storage capacity of our present building, it will be possible, using compact storage (and effecting all the various other changes mentioned) to provide book storage capacity, *in our present building, for approximately fifty-five years of growth.*

What do these last paragraphs mean in terms of dollars? The operational cost of our compact storage program so far, over the four years that it has been going on, has been less than \$3000 a year. Three years more of it should see its completion. To complete it will also require about \$12,000 worth of additional shelves. These are being purchased gradually as we need them. This means that, at a total expenditure of approximately \$33,000, and this expenditure spread over a seven year period, we will have provided ourselves with an additional stack storage capacity which would—at today's building costs—have cost us somewhere around \$300,000. To gain \$300,000 worth of additional stack storage at a net cost of not over \$33,000 seems to us an excellent financial transaction! To learn the ultimate saving, to us at Wesleyan, of compact storage as a book housing methodology, each of these two respective figures would have to be almost trebled, i.e. approximately \$90,000 of compact storage cost as against approximately \$850,000 for conventionally built stackage giving an equivalent amount of additional storage capacity.

CHAPTER 4.

SOME OBJECTIONS ADVANCED AGAINST COMPACT STORAGE

AT about this point the writer is sure he can hear a low rumble of protest, protest that he can summarize in somewhat the following words: "You talk about carrying in stock bins of boxes in ninety or more different sizes, of 'guillotine cutters' and of special knives for them, etc., etc. We happen to be a relatively small library. Your compact storage plan may be entirely practicable for a large library which has all these facilities you so glibly mention. But what about us? We too gravely need more storage space. What can *we* do about it?"

This objection has been one of the first to be raised against this compact storage plan, and it is an entirely reasonable one. Fortunately there is an answer to it. First of all, as we have seen, a very large proportion of "compact storage" books can be "turned" and "bottom marked" with the requirement of no more equipment than a pen and some ink. Next: for even a small library a "guillotine cutter" is not an utter impossibility: it does not necessarily mean a power cutter. As a matter of fact our own cutter is a small, hand-operated one costing only a few hundred dollars, taking up less than twenty

square feet of space, and operatable by any boy. But, if your library is too small to permit of even this much of an investment, it doesn't have to bottom crop its books at all: it can eliminate all cropping by boxing everything that can't be bottom marked "as is."

As for carrying on hand a large "stock" of boxes. Any library attempting compact storage at all must have a complete range of widths in the height sizes it initially selects: otherwise a large part of the economy of this form of storage would be lost. But, at the start, it does not need to have all the heights. The six-inch and seven-inch boxes alone will take care of over two-thirds of all compact storage requirements. If you wish, you may leave out the four-inch box size entirely, putting four-inch books and smaller, into five-inch boxes.* Besides a small library needs to have only a very small "stock." Perhaps as few as a dozen boxes of each size will be enough, and this would mean an initial investment of less than \$200. More of each size could be bought as stock of it got low. If a number of libraries should adopt compact storage the box manufacturer who supplies us assures us that he would himself carry boxes "in stock" in all sizes, supplying them in any quantities a library might desire.

* After our own experience I am inclined to think that, unless my library happened to be a very large one indeed, I would simplify the whole problem of sizing (including both shelving segregation and the carrying of a "stock" of boxes) by omitting two of the above sizes, viz. the 4" and the 8". There are so few 4" books, relatively speaking, that they can be combined with the 5" ones without significant loss of space; and, similarly, all 8" books can be included with the 9" ones. This simplification would cut down the number of "sizes" from six to four.

Naturally, if boxes were bought in very small quantities their unit cost would be somewhat higher, and this would, by so much, diminish the saving in storage cost that they would effect. On the other hand, if any real demand for such boxes develops, mass production would help to reduce their present cost; and other box suppliers would come into the picture, permitting competition to get in its beneficial work.

Here is another frequently asked question: if we increase the storage capacity of our present stacks by as much as 60% in number of volumes will we not dangerously overload their weight capacity?

The first answer to this very proper query is that the engineering "margin of safety" in any such a steel construction as a library stack is a great deal more than 60%. In the case of the Snead stack, for example, I am informed that it is between 300% and 400%, and I am further informed by the Snead people that they provide an additional surplus of load capacity.

But there is a second answer that is even more reassuring. An increase of 60% in the number for volumes housed in our present stacks through compact storage by no means implies an increase of 60% in load over the "rated" capacity of the stack. Under normal conditions no book stack is ever filled to anywhere near its rated capacity. The difference in weight between a range full of solid 9"x12" periodical quartos and a range full of 5"x7" books of fiction is very great. But stack engineers, in computing stack

capacity, cannot safely assume that any particular part of the stack will happen to be lightly loaded: they have to assume that heavily loaded cases, ranges and decks may happen anywhere in it. Which means that *every* part of the stack has to be built to carry heavily loaded tiers—plus always the accepted engineering margin of safety, and plus (in the Snead case at least) the extra or surplus margin.

In turned book storage, however, we know by its very terms that its 60% increase in volume capacity will *not* be distributed equally so far as increase of weight load is concerned. We know that the increase in number of volumes *will be least with heavy weight* books. With 9" x 12" volumes we are able to gain only a single additional shelf, i.e. in this section of the stack we will have increased the weight load only 12½% (which is less than the "surplus margin.") With 4" x 6" volumes, on the other hand, although we in this case actually double the number of shelves, and so have given ourselves a 100% increase in volume capacity, each one of these little books weighs so little that the total weight of one of these doubled-capacity 4"x6" ranges is actually less than the weight of one of our present conventional (mixed book size) ranges.

All of which may be summarized into this explicit statement: book loads in compact book storage, although considerably greater than the average book load in conventional stack storage, will be still *below* the stack's rated load capacity.

Finally this question is asked: will not any compact

storage program turn the library attempting it "upside down" while the "transfer" process is going on?

The answer is "no." There is no reason why segregation of the sort here proposed need be a disturbing procedure. On the contrary it can be put into effect gradually, without noticeable interference with accustomed daily routines. When, six years ago, the writer first suggested a program of segregation for the Wesleyan library, he said: "It may be put into effect almost imperceptibly so far as users of the library are concerned. On the other hand its substantial economies would begin to accrue immediately—and would be cumulative."* Both these forecasts have proved to be correct.

It is one of the great advantages of compact storage as a method of re-shelving that, because it is completely flexible, it can be put into effect just as slowly or as fast as one wishes. We here at Wesleyan are, as has just been said, spreading our "initial program" over seven years. So spread, the cost burden of it in any one year is inconsequential. Since it requires no structural building change it can be carried on without either physical or organizational disturbance of the library. It can be stopped temporarily at any time and then taken up again. It can be applied first to one category of material, or to one section of the classification, and then to another. It can at any time pick out, and put into compact storage, one particu-

* Rider: "The Wesleyan University Library: an analysis of its past history, present position and possible future policy."

lar set, thus relieving congestion pressure at the exact point where it is desired to relieve it. In short, it is a storage plan that is so flexible that it can gain, for *any* library, both immediate relief and a gradually ever greater storage capacity.*

*Notice must, of course, be taken of its binding condition when one is considering shelving a turned-down book unboxed. For relatively thin books no difficulty is encountered, nor for medium thick books if their binding is sound; but turned-down very thick books, or heavy books with loose hinges, are going to sag, and break at their hinges, unless protected in some way. For most books presenting this particular problem boxing is indicated, for, if a book fits properly snugly into its box, it is practically impossible for it to sag. However, to make assurance on this point doubly sure, our rules call for inserting boxed books in their boxes with their back strips down. This position protects their binding hinges completely. We still have, however, one special problem, i.e. books so thick that we do not have boxes wide enough to take them, books six or seven inches thick for example. They are so few in number that it does not pay to carry boxes in stock for them. We put these books on the shelf, unboxed and turned down; but, to eliminate hinge damage, we tie them up with a red tape which we have always used for this and similar purposes. So far I doubt if we have had to apply this tape-tying-technique to more than twenty-five books in the entire stack, because, usually, books as thick as this are large in their other dimensions, i.e. "over size," and over size books (books over 12" high) do not come into our "compact storage" range.

CHAPTER 5

SOME BY-PRODUCT ADVANTAGES OF "BOXING"

THAT a box offers protection to its contents is obvious. Once a book is placed in a box it is preserved against dust, rubbing, careless handling, the warping of its binding, the breakage of the hinges, etc. Every time an unboxed book is vacuum-cleaned, every time it is shoved along on its shelf, it suffers a certain amount of wear and tear. How any book has managed to survive centuries of this slow but indefinitely relentless abrasion it is hard to understand.

It is with unbound material, however, that the protection element in boxing becomes significant. Without protection of some sort books placed on the shelves unbound disintegrate rapidly, and do so whether they are used or not. But how much protection is, in a given case, enough protection? For much used books the most substantial binding possible, however expensive in first cost it may be, is in the long run the cheapest binding. But this does not mean that the highest standards of durability should be set for all library binding, or that binding is necessary for all books. We are putting into compact storage only our less used books. If we insist upon binding *them* in a super-durable binding we are wasting money. What research materials need is not so much protection against use as protection against

the wear of long years of storage almost undisturbed by use. This "wear" is mainly a matter of dirt, and boxing helps the cleaning problem enormously. A little dust can enter the rear ends of the boxes; but, if the contents fit snugly—as they should—it gets no further. Generally speaking, we have found that boxed books stay fresh and clean. Even the boxes get relatively little dust on them for they too fit snugly into their respective shelves, and what dust they do get is easily removed, for their tops present a smooth, even surface to the vacuum cleaner brush.

These two paragraphs formulate nothing new. Everyone knows that boxing is a protection against dirt; and nearly all libraries do differentiate in their binding treatment of much used and little used materials. But, although few attempt to bind everything that comes into them unbound, the alternatives to which they resort are legion. Some libraries shelve unbound material in the unchanged form in which it came in. Some tie it up in suitably sized packages, either "as is," or placed between paste-board ends, or wrapped up in brown paper (this last being Harvard's practice). Some put it in "pamphlet boxes" of one sort or another (an ultra-expensive procedure at the price at which such boxes are commercially sold). Some put it in open metal containers (such as the so-called "Princeton" pamphlet box) which offer what might be termed the irreducible minimum of shelving protection.

Since in any large research library about half of all the items received do come in unbound this question

of the protective treatment of them is an important one. And, because it is important, and because here at Wesleyan we were fortunate in having a bindery of our own to do experimenting in, we have experimented, our own search for more binding economy tending more and more in the direction of trying to salvage as much as possible of each item's original binding, even though this was directly contrary to conventional binding practice.

The first operation in the conventional binding up of a volume of periodical issues, for example, is either to "strip" them or to "back crop" them (i.e. either to return them to their original state of folded unsewn "signatures," or to change them to the even more primitive condition of separate single sheets). The "stripping" process, which is preliminary to flexible sewing, is a particularly tedious and expensive one, especially so if—and this is the case with almost all side-wired, or side-sewn, periodicals and pamphlets—the book being taken apart has a glued or pasted cover; for, before re-sewing can be attempted, each of the tiny flecks of old glue must be carefully removed from the signature edges by hand without tearing or weakening them. "Back-cropping" is preliminary to "over sewing." It is a much quicker job, but it destroys the book for any kind of rebinding other than either over-sewing or "pad binding." In other words both "stripping" and "cropping" are weakening, or destructive, processes as well as additional ones. And both are merely preliminary to the actual work of binding.

When we gave these conventional practices unbiased consideration it more and more grew upon us as rather absurd that we should take a nice book, conveniently sized, and already strongly and flexibly sewn, (such a "book," for example, as a single issue of the *Yale Review*), that we should then proceed to tear it to pieces, at substantial cost as well as substantial damage to it, and that we should do this for no reason other than to bind up this conveniently sized "book," in combination with several other similarly sized, and similarly nicely sewn, books, in an inconveniently sized monstrosity called an "annual" volume, four or five inches thick and weighing as many pounds. Nor did the fact that this kind of "binding" was costing us about \$2.80 make us feel any better about it. What we had gotten for \$2.80 was a book so thick and so heavy that it was a burden to use and to carry around, a book expensive to send through the mail on inter-library loan (although such loans are a practice which we, as librarians, are supposed to be trying to encourage), a book so heavy that it was reasonably sure to break its binding at its hinges if it was ever dropped edge down on the floor—and such accidents do happen. In other words it seemed to us that we were, in altogether too much of our binding, paying too heavy a toll to precedent, or convention, or professional habit, or whatever else one chose to call it.

Shortly after our own bindery was installed we had developed what we called our "cheap," or "pamphlet," form of binding which we have ever since

given, in place of "full binding," to practically all pamphlets less than three-fourths of an inch thick. There was nothing particularly novel about this "cheap" binding of ours. It did no "stripping"; instead it retained intact, and used, the item's original sewn, or wire-stitched, binding. For covers it used light weight boards, with lining papers pasted inside them and the item's original cover pasted on the outside front cover. It glued on a narrow strip of cloth to serve as back strip and hinges; gave the item a flush guillotine trim all around; and, instead of stamping (always an expensive detail), it relied on the pasted front cover for author and title identification and on a hand-lettered call number on the back strip. All this may sound as though the bound result would look crude; on the contrary these "cheap bound" pamphlets of ours are not only sound and durable; they are also by no means unattractive little books. The important thing, however, about this method of binding them was that it cost us at the start, averaging all sizes and thicknesses, only fifteen cents an item, and that even now it costs us only about twenty-five cents—as against from eighty cents up for a "full bound," stamped item of similar size.

This cheap binding permitted still other economies. For example, as soon as we omitted stamping it became possible for us to put an accumulation of pamphlets through the bindery as one "lot," i.e. without the necessity of making out an individual "job ticket" for each one. It eliminated "rubs," the storing of them and reference to them. It meant, in

other words, a substantial saving in the clerical work of the bindery.

But to our "cheap binding" there had always been, prior to our initiation of "boxing," one serious objection: the items so bound didn't "shelve" very satisfactorily. None had any backstrip title; and, when they were very thin items, they could not even show a back-strip call number. This made them hard to locate on the shelves. Furthermore, when we had a long series of such thin items (as would be the case with the run of some "Annual Report," for example) they were individually too slender to stand alone; and, where there was a shelf full of them, they tended to fall down and slither around and get out of order in quite annoying fashion. (This, of course, wasn't any fault of the form of binding *per se*: full binding the same items wouldn't have helped).

Then our compact storage boxes came along: and, as if by magic, they automatically solved this problem of shelving lengthy runs of thin books. All we had to do was to box them in conveniently sized lots (i.e. from two to a dozen to a box). By "turning" them we saved storage space. But, by boxing them, we made it not only possible to "bottom mark" them for turning; we also made them much more easily findable on the shelves and kept our shelves much more orderly. Even our thinnest boxes have a back strip wide enough to take a typed label, and series of pamphlet items are put in boxes whose labels have plenty of room for a full statement of their contents.

Having first used this cheap-binding-plus-boxing

treatment for "reports" and similar continuations we began to look into its applicability to regular periodicals. Our previous technique for the handling of periodicals had followed generally accepted patterns. We had had: first, a checking of all receipts, to be sure that we had received all issues. Then a reposing of these separate issues on the shelves of our periodical room until a "volume" of them had accumulated there. Then a checking of them over again to be sure that the volume was complete for binding (and a filling-in of missing issues in case it wasn't). Then the making out of a bindery order ticket, and a sending the "volume" up to our bindery for binding. Then there followed in the bindery: the destruction, as stated, of the entire original binding of each issue; then a resewing, by hand or by machine, of the "volume" as whole; then the rest of the binding operation—end-papering, trimming, rounding and backing, case-making, stamping, head-banding, casing-up, pressing, cleaning, inspecting, etc., etc. These totaled up to an expensive series of processes.

Suppose that, instead of full binding by "volume," we gave each separate issue our simple "pamphlet binding" treatment. Suppose that we then collected these issues, so bound, into a compact storage box holding one "volume" of them. We would make our usual saving on storage cost. But we would also save on binding. Our binding cost on such a quarterly issue periodical as the *Yale Review* would be less than one dollar a volume instead of our previous \$2.80. On a monthly periodical, which we had been bind-

ing into two volumes a year, our new cost might be \$2.40, where it had previously been \$5.60. And so on, depending on the number, the size, and the thickness of the separate issues of each particular volume bound.

Then we found that economy was by no means our only gain. There were important "service" advantages in this new method of binding our periodicals. When we tried the idea out tentatively our faculty members came to us and asked us if it could not be extended. They had discovered that, in the case of those periodicals to which we had applied it, they could carry home one pound of "book" instead of four pounds to secure the use of the specific article they wanted.*

This in turn automatically gained a second advantage. When Professor "A" took out one of our old-style, conventionally bound, annual volumes he took out anywhere from three to eleven issues that he had no use for in order to take the one issue he wanted. But this meant that he tied up those other three to eleven issues so that no one else could use them. Under our new, separate-issue, plan of binding, when Professor "A" took home only the one issue he wanted, Professor "B," wanting a different issue of the same volume, found it waiting for him in its box. In other words greater flexibility in the binding of

* It should be explained that, except for certain special types of material, we do not "circulate" any *boxes*. Our boxes usually stay on our shelves. We circulate only the material inside them. If the box contains several items the reader takes only the one he wants.

our materials was affording greater flexibility in the use of them.

We have had three objections to this plan of splitting up bound periodical volumes into bound separate issues: first, that small separate volumes are more easily lost than large fat ones—which is probably true;* second, that the call number markings on split-up parts of volumes have to be longer; and third, that, when title-pages and indexes are provided for a “volume” by its publishers, the volume “ought,” according to good cataloging practice, “to be bound up in the unit that the title-page calls for.” But the sad facts in rebuttal on this last objection are that an increasing number of publishers no longer provide title-page and indexes and that the limitations of bindery machinery frequently force us to split up “publishers volumes” anyway.

Now that we are on the subject of objections two that have been brought against our general boxing procedure should be mentioned. The first is that the boxes that we use break at their joints when they are mishandled. It must be admitted that they do: they are cheap boxes. But—to repeat once again—the material that we are putting into them is research material, that is material which, by its very definition, is not going to be handled frequently. Handled infrequently, and barring accident, our boxes are going to last a long, long time. And, in that occasional case when one does get dropped some distance and broken

* But the loss, or theft, of occasional single-issue “volumes” would never off-set the economy of single-issue binding.

we console ourselves by remembering that it costs much less to throw the broken box away and label another than it would cost to rebind a book of the same size that happened to get a similar mishandling.

It is also true that boxed storage is not quite as efficient as bottom-cropped storage because the boxes themselves take up a certain amount of the precious shelf space that we are trying to save. To be exact they take up a little over five per cent of the total shelf space. We would again emphasize, however, that: 1. whenever possible we do not box; 2. we do not waste space inside boxes; and 3. we do not put every book in a separate box.*

* It might be added here, as a last footnote, that at Wesleyan we have modified a good many minor points in other conventional "processing" procedures. We found, for example, that even in our relatively small library we were taking half the time of one member of our staff just to paste book plates in our new accessions. A book plate is, after all, nothing but a label, conventionally pasted on the inside front cover of a book, to show the book's ownership. In the case of library books it also provides a convenient place to give credit to the book's donor (if the book is one that came in as a gift) and to mark the book's accession number (if the library uses accession numbers) and for its call number.

It seemed to us, when we reviewed it, that "plating" did not justify so much expenditure of time as this. We have since managed to cut it in half, partly by installing a small Potdevin paste-spreading machine but mainly by omitting book plates altogether on certain categories of accessions. All *gifts* we plate. Also all new *bought* books. All pamphlet-bound items we do *not* plate. Since 1945 we have been showing that these items belong to our Wesleyan Library, at practically no cost, by using, in all our own binding, a special end-paper stock which we had over-printed with the words "Wesleyan University Library," in faint tint, in an all-over diaper pattern. These end-papers also give a pleasingly individualized appearance to all the books bound in our own bindery. Our present pattern is a linotype set one: some day we hope to develop something more "dressy" perhaps a hand-drawn or monogram one. We were recently interested to learn that the Library of Congress has, within the last few months, adopted this same identifying end-paper idea.

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